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**SUBPOPULATION DIFFERENCES IN
PERFORMANCE ON TESTS OF
MENTAL ABILITY:**

**Historical Review
and
Annotated Bibliography .**

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Human Resources Research Organization

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<p>This paper presents a review of subpopulation differences in performance on tests of mental ability. Six categories of subpopulation differences are examined; sex, age, race, ethnic, social class, and other (including education, geographical location, and physical characteristics). Selected references (40) are briefly described in an annotated bibliography in order to: (a) acquaint the reader with the so-called "classic" works and a representative sample of studies in the field; (b) characterize the literature dealing with controversial aspects</p>		

20. continued...

of group differences and intelligence testing; and (c) provide a general "road map" for those who wish to pursue further the subject of the paper.

It should be noted that no attempt is made to present, explain, or analyze the possible causes of the observed differences. However, the interested reader can find references to several recent books on causative factors in the annotated bibliography and supplementary notes.

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PREFACE

In 1980, the Department of Defense (in cooperation with the Department of Labor) sponsored a large-scale research project to assess the vocational aptitudes of American youth and, concurrently, to establish revised national norms for the Armed Services Vocational Aptitude Battery (ASVAB). In order to accomplish this end, the Department of Defense commissioned the National Opinion Research Center (NORC) of the University of Chicago to administer the ASVAB to a probability sample of American youth. The sample consisted of approximately 12,000 young men and women, selected from participants in the National Longitudinal Survey of Youth Labor Force Behavior (sponsored by the Department of Labor).

The Department of Defense is currently analyzing the results of the 1980 nationwide administration of the ASVAB. The present review of literature on subpopulation differences in test performance was supported as a supplementary part of the larger research undertaking. The publication of this technical memorandum will facilitate its intended use as a research guide and reference for the conduct of subpopulation analyses of ASVAB data.

The views and interpretations presented in this review and annotated bibliography are those of the author and do not represent necessarily the opinions or policy of the Department of Defense.

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SUBPOPULATION DIFFERENCES IN PERFORMANCE ON TESTS OF MENTAL ABILITY: HISTORICAL REVIEW AND ANNOTATED BIBLIOGRAPHY

This paper presents a review of subpopulation differences in performance on tests of mental ability. No attempt is made to present, explain, or analyze the possible causes of the observed differences. There is a substantial body of literature, dating back to the very beginning of psychometric research, which deals with the various factors producing differences and the influence of heredity and environment on individual psychological traits. The interested reader can find references to several recent books on causative factors in the annotated bibliography.

Six categories of subpopulation differences are examined in the paper: Sex, Age, Race, Social Class, Ethnic, and Other (including education, geographical location, and physical characteristics). These are the categories or "dividing lines" of the general population that have been investigated most frequently and vigorously in the literature. Of all the various possible population subgroups, "race" has attracted by far the most attention of psychologists and other scientists. More specifically, the bulk of historical literature in this field has focused on the differential mental abilities of white and black Americans. During the past decade, fewer studies have actually explored the nature of observed differences between the two races; instead, writers and researchers have attempted to find the genetic and environmental influences, and then argued in print over the scientific value of their discoveries.

It appears as though a major casualty in the continuing battle on race differences is the general study of Differential Psychology. As the focus of research shifted to race issues and other socially relevant concerns, publications in the "science of human differences" more or less passed from sight. The present study therefore suffers from a heavy reliance on a few classic, but dated, references.

This paper does not pretend to approach any degree of comprehensiveness in treatment of the subject. It is a modest effort to sketch what is thought to be known about the differential mental abilities of various population subgroups, what is perhaps known, and what is not. The writer makes no special claim to knowledge or understanding of subpopulation differences in terms of intelligence test scores. However, there are several notable and accomplished individuals who have dedicated the better part of their professional careers to the study of group differences. The findings and conclusions of these scientists are incorporated as much as possible—and in their own words—within the separate discussions of subpopulation differences and in the accompanying notes.

SEX DIFFERENCES

"Until the turn of the century," Gelman and Carey (1981, p. 81) write, "researchers sought evidence to support what everyone assumed to be true: that men were smarter than women." Indeed, studies conducted in Paris during the late 1800s found that the brains of men were, on the average, about 14 percent larger than the brains of women—clear "proof," the craniologists concluded, that the male species is intellectually superior.

"There were no real villains in the drama," note the authors (p. 81), "only proper Victorians who felt it was in society's interest to show that women were designed for lesser tasks. Scientists argued that if women used their brains excessively, they would impair their fertility by draining off blood cells needed to support the menstrual cycle."

Over one-hundred years later, scientists are still investigating and debating the observed differences between men and women. A recent cover story in *Newsweek*, (1981, p. 72), for example, outlines the focal point of current research on "Just How the Sexes Differ:"

Research on the structure of the brain, on the effects of hormones, and in animal behavior, child psychology and anthropology is providing new scientific underpinnings . . . [for the position that] men and women are different. They show obvious dissimilarities, of course, in size, anatomy and sexual function. But scientists now believe that they are unlike in more fundamental ways. Men and women seem to experience the world differently, not merely because they feel it with a different sensitivity of touch, hear it with different aural responses, puzzle out its problems with different cells in their brains.

"No topic in psychology is of more perennial interest than sex differences," writes Leona Tyler (1965, p. 239). "Study after study, book after book, testify to the fact that research workers, writers, and readers consider the subject one of paramount importance." At the same time, psychologists and other scientists have expressed an interest in comparing the measured intelligence of males and females ever since the day when it was first concluded that intelligence tests were "direct indicators" of native intellectual abilities.

Yet, as Matarazzo (1972, pp. 352-353) observes, from the very beginning of IQ test development, great care was taken to counterbalance or eliminate from the final scale any items or subtests that empirically were found to result in a higher score for one sex over the other. 1 The final scales of each of the revisions of the Stanford-Binet, the Wechsler Intelligence Scale for Children (WISC), the Wechsler-Bellevue Scale, and the Wechsler Adult Intelligence Scale (WAIS), for instance, were shown on their respective standardization samples to favor neither sex. This was a clearly-stated methodological control. For some reason, nonetheless, dating back to the introduction of the Binet-Simon Scale, numerous studies have attempted to locate potential sex differences in IQ on the very same scales of measurement. The majority of these hundreds of studies, Matarazzo points out, consequently corroborated the findings in the original standardized samples (where no explicit attempt was made to eliminate sex differences). That is, females performed better on certain vocabulary-type items, while males excelled on arithmetic items (see Matarazzo, 1972, pp. 353-357).

"It is still a reliable generalization," Maccoby and Jacklin (1974, p. 65) find, "that the sexes do not differ consistently in tests of total (or composite) abilities through most of the age range studied." The majority of studies of general ability (with subjects over the age of 6), the authors continue, appear to have used well-balanced tests, since they do not (as a rule) find any sex differences. Studies that show higher scores for girls, on the other hand, seem to rely heavily on subtests measuring verbal ability or requiring reading (see Anastasi, 1958, p. 460; Maccoby and Jacklin, 1974, p. 68). Jensen (1980, p. 624) adds here that tests of general intelligence not constructed to minimize sex differences (e.g., Raven's Progressive Matrices and Thurstone's Primary Mental Abilities) show "hardly any larger or more consistent sex differences in total scores" than tests constructed to favor neither sex.

Maccoby and Jacklin (1974), in fact, have compiled one of the most comprehensive reviews of recent scientific evidence on sex differences in *The Psychology of Sex Differences*. In an examination of "Intellectual Abilities and Cognitive Styles," for example, the authors probe the results of over 570 separate studies comparing the tested abilities of males and females. As shown in Table 1, the majority of these studies—with variation according to the specific type of test used—clearly find no sex differences (i.e., when the statistical test yields a probability value of .05 or less).

Female superiority on verbal tasks, Maccoby and Jacklin (1974, p. 75) still observe, has been "one of the more solidly established generalizations in the field of sex differences." Sex differences begin to appear about the age of eleven, the authors (p. 351) find, with female superiority increasing through high school and possibly beyond. "Girls

Table 1

**Number of Studies on Sex Differences in Various Tested Abilities,
Arranged by Outcome and Type of Test Used**

Type of Test Used	Number of Studies by Outcome ^a		
	Differences Favor Males	Differences Favor Females	No Difference Between Males and Females
General Intellectual Abilities	3	15	40
Spontaneous Vocal and Verbal Behavior	2	8	19
Tested Verbal Abilities	13	37	81
Quantitative Ability	16	4	15
Spatial (Visual, Nonanalytic) Ability	9	2	24
Spatial (Visual-Analytic) Ability	25	3	35
Impulsivity, Lack of Inhibition	8	3	26
Anagrams	0	4	6
Conceptual Level	6	4	41
Reasoning	7	5	26
Divergent Thinking-Verbal Creativity	5	11	16
Nonverbal Measures of Creativity	8	8	7
Moral Judgment	5	7	18
ALL TESTS	107	111	354

^aStudies on sex differences in various tested abilities were compiled from summary tables presented in Chapter 3 ("Intellectual Abilities and Cognitive Styles") of Maccoby and Jacklin (1974). Studies are shown to have a difference "favoring" a sex when the statistical test yields a probability value of .05 or less. Most of the original research projects were conducted in the late 1960s and early 1970s.

SOURCE: G.E. Maccoby and C.N. Jacklin, *The Psychology of Sex Differences* (Stanford, CA.: Stanford University Press, 1974).

score higher on tasks involving both receptive and productive language, and on 'high level' verbal tasks (analogies, comprehension of difficult written material, creative writing) as well as upon the 'lower-level' measures (fluency). The magnitude of the female advantage varies, being most commonly about one-quarter of a standard deviation." 2

Males, on the other hand, apparently excel in visual-spatial and mathematical abilities. "Male superiority on visual-spatial tasks is fairly consistently found in adolescence and adulthood," state Maccoby and Jacklin (1974, pp. 351-352), "but not in childhood. The male advantage on spatial tests increases through the high school years up to a level of about .40 of a standard deviation." Beginning about the age of 12 or 13, the mathematical skills of boys start to pass those of girls. The magnitude of male superiority on mathematical skills displays substantial variation and is "probably not so great as the difference in spatial ability," note the authors (p. 352); and the apparent disparity in the degree of sex difference from one measure to another may reflect the fact that "both visual-spatial and verbal processes are sometimes involved in the solution of mathematical problems." (Average differences on tests of mathematical skills vary from one-fifth to two-thirds of a standard deviation in several studies of high school students.)

In 1958, the bulk of research on sex differences was summarized by Anastasi (p. 497) in the following manner:

Males tend to excel in speed and coordination of gross bodily movements, spatial orientation and other spatial aptitudes, mechanical comprehension, and arithmetic reasoning. Females tend to surpass males in manual dexterity, perceptual speed and accuracy, memory, numerical computation, verbal fluency, and other tasks involving the mechanics of language.

In 1956 and, again, in 1965, Tyler (1956, p. 255; 1965, p. 247) offered a similar appraisal of sex differences in tested abilities:

To summarize, males are clearly superior on tests of mathematical reasoning, spatial relationships, and science. Females are superior in verbal fluency, rote memory, perceptual speed, and dexterity. Some of these differences develop earlier and appear to be more fundamental than others.

Recent research in the "Study of Mathematically Precocious Youth" by scientists at Johns Hopkins University (see Benbow and Stanley, 1980) provides some further indication of sex differences in quantitative skills. Over 20,000 7th and 8th graders since 1972 have been tested using the mathematics and verbal portions of the Scholastic Aptitude Test (SAT). And, every year, Johns Hopkins researchers have found that girls and boys perform equally well on the verbal portion—but that boys do significantly better on the mathematics subtest (e.g., more than twice as many boys as girls had scores of 500 or greater on the mathematics portion of the test). 3 "These data show," Benbow and Stanley (1980, p. 1262) state, "that large sex differences in mathematical aptitude are observed in boys and girls with essentially identical formal educational experiences"; and, "we favor the hypothesis that sex differences in achievement in and attitude toward mathematics result from superior male mathematical ability, which may in turn be related to greater male ability in spatial tasks" (p. 1264). 4 Needless to say, the views and interpretations of the Johns Hopkins researchers are not shared by all (see, for example, Kolata, 1980, pp. 1234-1235). 5

AGE DIFFERENCES

The Army Alpha test results from World War I provided some of the first documented evidence of population differences based on chronological age. 6 The Army data revealed that a steady decline in test performance corresponded clearly with increases in the ages of men examined. Subsequent cross-sectional studies of the general population over the next several decades confirmed the discovery of the Army psychologists. Indeed, later research consistently supported the finding that mental ability (1) reaches a peak in early adulthood (the mid-twenties), (2) declines gradually to about fifty (depending largely on the type of task involved), and (3) drops steeply thereafter (see Tyler, 1956, p. 350; Anastasi, 1958, pp. 239-243). This apparent "age curve of intellectual decline" is less likely to occur in verbal and highly practical abilities; and there is some evidence to suggest that age-related differences are more likely to result on tests having a timed or "speeded" component (or those that require rapid adaptation to new situations) than on those allowing unlimited completion time (Tyler, 1965, p. 282).

However, Cronbach (1960, p. 196) writes, even though many studies reveal stages of intellectual degeneration with age, "this result is no longer accepted as a true picture of the course of intellectual growth and decline. All the studies showing a drop in early adulthood are cross-sectional, i.e., the average of each age is based on a different group of persons [and members of different generations who developed their abilities under different social circumstances]." Thus, states Matarazzo (1972, p. 107), "prior to the studies by Bayley (1970) . . . and in the absence of longitudinal studies which re-examined at fixed intervals the same individuals as they grew older, it was logical to assume, as was done almost universally years ago, that cross-sectionally derived growth curves . . . were probably representative of the growth of mental ability; namely, they depicted the expected change in mean raw or standard test scores of the average individual as a result of the developmental process per se."

In 1956, Tyler (p. 350) hinted that there might be possible problems associated with cross-sectional analyses when she pointed out that "longitudinal studies have cast doubt on the inevitability of the decline from twenty to fifty, at least for educated people." 7 Longitudinal studies by Owens (1953) and Bentz (1953), for instance, showed significant improvement by individuals on reexaminations over time. Follow-up studies of Terman's "gifted children" similarly suggested that advanced age did not correlate with a sudden drop in measured intelligence. The continuing longitudinal studies since 1928-1931 by Bayley and her associates (Bayley, 1955; Bayley, 1970), Bradway et al. (1958), and Kangas and Bradway (1971) served to question further the previous assumptions concerning intellectual decline.

"How shall we reconcile this apparent conflict between the results of cross-sectional and longitudinal studies?" Tyler (pp. 284-285) later queried in 1965. "The longitudinal studies . . . cannot prove that no decline has occurred at any time during the period of years the study covers. Furthermore, they do not supply any evidence on what may be happening during the years past middle age when more drastic declines had been suggested by cross-sectional research." In summary, then, Tyler (1965, p. 286) writes, "we can say that intellectual powers keep on increasing well into early adulthood if adequate educational stimulation is provided":

Throughout the middle decades of life, they remain at about the same level, although their apparent stability may result from slight increases in some sorts of abilities and slight decreases in others. During the years from fifty on, some decline in most sorts of mental ability probably occurs, and during the seventies and eighties its effects are clearly apparent.

There is still very little longitudinal evidence concerning the shape of the so-called "age curve." "Longitudinal studies, which are now more numerous than they used to be, are more conclusive than cross-sectional studies," writes Tyler (1965, p. 298), "but our conclusions still rest largely on cross-sectional evidence." And longitudinal studies—though they have also been criticized on methodological grounds (including the effects of attrition and the notion that passages of time favor the "survival of the fittest")—have all but debunked the idea that the biological processes of aging beyond full maturity result in decreased mental ability. Tyler (1965, p. 284) postulates that the decline during early adulthood in several of the older studies may be attributed more to the scarcity of intellectual stimulation than to any biological changes in nervous systems. In fact, there is some evidence to suggest that intellectual decline is offset by educational (or intellectual) stimulation. Nonetheless, evidence showing a decline in abilities during the sixties and beyond has been found in longitudinal as well as cross-sectional studies.

RACE DIFFERENCES 8

As Tyler (1965, p. 299) observes, "up to the beginning of this century, there was scarcely a dissenting voice in the general consensus among persons of European descent that definite mental differences in the various races paralleled their obvious physical differences, and that the white race was unquestionably superior to all the others." Indeed, examples of such views can be quite easily found in articles and commentary spanning the past one hundred years of experience in mental testing. Even today, there are those who claim that "most of the research on group differences in intelligence has been motivated by a desire to affirm the superiority of one group over another" (Ehrlich and Feldman, 1977, p. 120; emphasis in original).

Cronbach (1960, p. 204) similarly points out in *Essentials of Psychological Testing* that racial comparisons have often been misinterpreted "because liberal writers want to prove that there are no innate differences in ability, and certain conservatives want to prove that nonwhite groups will not profit from improved educational opportunity." ⁹ And the historical dialogue concerning the so-called biological correlates of test performance has continued since the days when Binet and Henri (1895) first proposed to study the nature and extent of individual differences in psychological processes and the interrelationships of mental functions. Each generation has since attempted to reinvent the classic "nature-nurture" argument over the relative influence of heredity and environment on measured "intelligence." ¹⁰

The latest flurry of new studies in the classic "nature-nurture" debate has been spawned largely by the writings and associated activities of three prominent scientists—Arthur R. Jensen, Hans J. Eysenck, and William B. Shockley—who have helped to popularize (however unintentionally) a genetic theory of racial inferiority. The seeds of the modern controversy were actually planted with the publication in 1969 of an article by Jensen in the *Harvard Educational Review* (see Jensen, 1969). Jensen discussed the concept of "heritability" and developed a statistical model to explain how IQ can be separated into its genetic and environmental components. Jensen's findings led him to conclude that social class and racial variations in intelligence (general ability) must be attributed primarily to genetic differences. Educational programs have been generally ineffective in altering the relative status of individuals and groups on the general-ability dimension; and, since there are certain genetic limits, he thus determined, a diversity of approaches and aims in education should be structured to conform with different patterns of ability among children.

After Jensen's article on IQ and race appeared, a Presidential Cabinet meeting was convened on the subject, and the author was asked to testify before Congress on the failures of compensatory education. Numerous scholarly articles and books were subsequently published both in criticism and in defense of Jensen's findings. ¹¹ Because the appearance of the article coincided with the tail end of the Great Society and the return of political conservatism to the White House, a great deal of the material that appeared in the early 1970s suffers from partisan subjectivity, emotionalism, and a general lack of scientific method. In follow-up studies on the subject of *Educability and Group Differences*, Jensen (1973, p. 355) found that, on the average, "genetic factors appear to be about twice as important as environmental factors, including prenatal influences"; and, further, "that something between one-half and three-fourths of the average IQ difference between American Negroes and whites [i.e., between 8 and 11 IQ units] is attributable to genetic factors, and the remainder to environmental factors and their interaction with the genetic differences" (p. 363).

The subject of race differences in performance on mental tests is consequently one of the most divisive issues and the most discussed aspects of the entire IQ and testing controversy in recent years. Jensen's hypotheses have even gained permanent standing by being labeled the doctrine of "Jensenism" (though the term is used in the derogatory sense as a synonym for "scientific racism"). As a result, many studies of race differences often generate more heat than light. The subject itself is politically sensitive, and an area of investigation sometimes avoided by social scientists who simply wish to stay out of the fray. ¹² Fewer articles are written (for fear of professional embarrassment), and most of those that are published scrupulously tend to evade the volatile issue of "heritability." Interestingly, the most detailed and thoroughly researched book yet to appear on the topic of bias in mental testing is the recent work of Jensen (1980).

The Military Testing Experience

Aptitude testing by the American military during World War I gave impetus to later studies of racial differences. Tyler (1956, p. 285) observes that the most extensive program of adult testing by means of which whites and blacks could be compared was the work of Army psychologists during World War I: "Results here seemed to confirm everything that other investigators had been finding with children as subjects. In every comparison where the scores for a group of Negroes and an equivalent group of whites were placed side by side, there was a significant difference in favor of the whites." In fact, when the different tests used during World War I (Army Alpha, Army Beta, and individual examinations) are combined onto a common scale, the following distributions of white and black (male) military recruits are found (Loehlin et al., 1975, pp. 143, 408-309):

Score Category	Male Military Recruits (Percent)		Differences (In Standard Score Units)
	White	Black	
18+	6.7	0.4	1.14
14 - 17.9	33.8	6.5	
10 - 13.9	48.1	41.5	1.24
6 - 9.9	10.9	45.8	1.24
0 - 5.9	0.5	5.8	1.01
TOTAL	100.0	100.0	1.16 Mean

The Army test results from World War I indicate a mean difference in measured intelligence between white and black recruits of 1.16 standard score units or approximately 17 IQ points (based on the conventional IQ standard deviation of 15 units). The World War I testing experience supported the popular contention of the period that blacks, as a group, were inferior to whites in native intelligence. Gropman (1978, p. 2), for example, cites a "typical" study of the 1920s by the Army War College which attributed the relatively poor performance of blacks to the observation that the "cranial cavity of the Negro is smaller than the white." Those blacks who did score well on intelligence tests, the study concluded, possessed a "heavy strain of white blood."

Subsequent studies of the Army test results further revealed that (a) Northerners consistently scored higher than Southerners of the same race and (b) whites consistently scored higher than blacks of the same region (see Tyler, 1956, p. 286; Shuey, 1966, pp. 310-312).

The Army General Classification Test (AGCT) of World War II largely replaced the tests of World War I. The AGCT was described as a test of "general learning ability" and was intended to be used in the same manner as the Army Alpha—"capable of reliably sorting new arrivals according to their ability to learn quickly the duties of a soldier" while "keeping at a minimum items greatly influenced by amount of schooling and by cultural inequalities" (see Staff, Personnel Research Section, 1945, p. 760). The so-called "rapid learners" (those achieving standard scores of 130 or above) were ranked at the top in Army Grade I; the slowest learners (those with standard scores of 69 or below) were placed in Grade V. ¹³

"That there were fewer Negroes with average backgrounds measured in terms of educational and vocational experiences was not the fault of the tests," historian Ulysses G. Lee (1965, p. 242) writes. "That there would be fewer high scorers among Negroes per hundred than among whites was expected. How great a disparity existed was fully demonstrated after the first months of testing." And, "while both Negroes and whites, in general, scored lower on the Mechanical Aptitude Test [an additional test given to newly inducted men] than on the AGCT, here the racial disparities between the highest and lowest classes were, as would be expected from an examination of the vocational opportunities and experiences of Negroes, even more marked." As shown in Table 2, during the first twenty-two months of the mobilization, close to half of all blacks scored in the lowest AGCT grade, compared with about 8 percent of whites. On the Mechanical Aptitude Test, approximately two out of three blacks were classified in Grade V—compared with about one out of six or seven whites. And by the end of the war (June 1944 through May 1945), the white-black differential in test scores on the AGCT had widened. ¹⁴

The relatively lower scores of blacks on these tests operated to place a disproportionate number of blacks in the semiskilled and unskilled military occupations. (About 78 percent of all black males in the Army—compared with 40 percent of all white troops—were placed in the service branches.) ¹⁵ At the same time, as Shuey (1966, p. 345) concludes, there was "two to three times as high a rejection rate for low mental test scores among Northern Negroes as among Southern whites and . . . the lower induction rate of Negroes in general, as compared with whites in general, was not due to a greater number of physical disqualifications but to a preponderance of low mental test scores."

The Alpha and Beta tests of World War I and the AGCT of World War II served as prototypes for the Armed Forces Qualification Test (AFQT). The AFQT was introduced operationally in 1950 with the following two objectives: (1) "To differentiate the examinees who can effectively acquire military skills from those who cannot—in order to eliminate the latter group"; and (2) "To provide a general index of the potential usefulness for military service of the examinees who qualified for military service, commensurate with their mental ability" (see Karpinos, 1977, p. v). Since its introduction

Table 2

**Distribution of Scores on the Army General Classification Test (AGCT) and
Mechanical Aptitude Test (MAT) Among Army Inductees
Processed for Enlistment During Selected Periods by Race**

Army Grade Classification	Army Inductees Processed for Enlistment (Percent)					
	AGCT		AGCT ^a		MAT ^b	
	March 1941-December 1942		June 1944-May 1945		September-December 1942	
	White	Black	White	Black	White	Black
I	6.6	0.4	4.3	0.1	4.0	0.1
II	28.0	3.4	25.5	1.6	19.1	1.5
III	32.1	12.3	33.1	7.1	34.6	8.1
IV	24.8	34.7	31.8	43.1	27.5	24.8
V	8.5	49.2	5.3	48.1	14.8	65.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
Number (000)	4,129	440	N/A	N/A	1,800	180

^aThese figures are based on data derived by Loehlin et al. (1975) from R.K. Davenport "Implications of Military Selection and Classification in Relation to Universal Military Training," *Journal of Negro Education* 15 (1946): 585-594. These figures are based on tests taken after induction. However, Loehlin et al. adjusted the lowest category upward to reflect preinduction screening on mental tests. (See Appendix L in the source for a description of the procedure.) It should also be noted that after 15 July 1942, the standard score for Grade IV was extended from 70-89 to 60-89; and the standard score for Grade V was narrowed from 0-69 to 0-59.

^bMechanical Aptitude Test scores are for men processed at Reception Centers during the period shown.

SOURCE: AGCT score distributions for 1941-1942 and Mechanical Aptitude Test score distributions are from Ulysses G. Lee, *United States Army in World War II, Special Studies: The Employment of Negro Troops* (Washington, D.C.: Government Printing Office, 1966), pp. 244-245. Data on AGCT scores for 1944-1945 are from J.C. Loehlin et al., *Race Differences in Intelligence* (San Francisco: W.H. Freeman and Company, 1975), p. 143.

in 1950, however, the AFQT has undergone several modifications in both its character and usage. For example, the original version included items to test verbal skills, arithmetic reasoning, and spatial relations; a tool functions subtest was added in 1953 and then dropped in 1973; and, as of 1980, the AFQT no longer includes spatial relations but places increased emphasis on verbal and quantitative items. Further, the number of items comprising the AFQT has varied over time, scoring procedures and the ordering of items have changed, and test calibration has not been consistent.

Nevertheless, the military's experience with the AFQT provides a basis for comparison of race differences dating back to 1953, when the first major modifications in the test were introduced. As shown in Table 3, white male nonprior service enlisted entrants to the armed forces have consistently scored higher on the AFQT than have members of other races (over 90 percent black) since the end of the Korean War. Recent data reveal that the differential between white and non-white recruits has decreased somewhat. However, only about 8 to 10 percent of non-white male enlisted accessions have usually placed in the "above-average" categories (I and II), compared with approximately 40 percent of the white males. In fact, the average (median) AFQT score for non-white males (ranging between the 25th and 35th percentile) is about twenty-five percentile points below the average AFQT score for white males (ranging between the 45th and 55th percentile) in the period since the end of the Korean War. 16

Table 3

Percentage Distribution of Male Nonprior Service Enlisted Entrants to All Services by Armed Forces Qualification Test (AFQT) Category and Race for Selected Years, 1953-1980

Male Nonprior Service Enlisted Entrants, 1953-1980 (Percent) ^a												
AFQT Category ^b	1953		1958		1964 ^c		1966 ^d		1968		1973 ^e	
	White	Other Races	White	Other Races	White	Other Races	White	Other Races	White	Other Races	White	Other Races
I	8.6	0.6	9.5	0.8	6.8	0.4	7.4	0.6	7.2	0.4	3.9	0.4
II	27.0	4.1	28.3	7.1	35.6	7.9	36.9	7.2	36.0	6.9	35.8	12.0
III	35.4	18.7	45.8	41.1	47.9	52.6	41.6	38.4	38.3	30.8	53.9	65.1
IV	29.0	76.6	16.4	51.0	9.7	39.1	14.1	53.8	18.5	61.9	6.4	22.5
TOTAL Number (000)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	668.0	86.5	393.9	32.1	371.6	45.3	842.9	90.2	713.3	99.5	256.4	63.9
AFQT Category ^b	1976		1978		1980		1953-1972		1973-1980		1953-1980	
	White	Other Races	White	Other Races	White	Other Races	White	Other Races	White	Other Races	White	Other Races
I	4.8	0.6	4.1	0.4	3.8	0.3	7.3	0.5	4.1	0.4	6.7	0.5
II	38.3	15.7	32.9	9.0	29.4	7.5	32.5	6.5	33.6	10.3	32.7	7.8
III	49.2	61.6	43.7	38.9	44.1	34.2	43.1	38.6	48.7	50.3	44.1	42.6
IV	7.7	22.1	18.7	51.7	22.7	58.0	17.1	54.4	13.6	39.0	16.5	49.1
TOTAL Number (000)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	252.0	70.7	197.2	71.5	227.4	79.4	9,720	1,215	1,998	604.9	11,718	1,820

^aPercentage distributions for 1953 through 1973 include all male (nonprior service) enlisted accessions (enlistees and inductees) who entered military service between January and December of the respective year or years. Percentage distributions for subsequent years cover the fiscal year period. Draftees who failed the mental tests but who were declared administratively acceptable for the basis of personal interviews and some additional mental testing) are included in Mental Category IV.

^bAll applicants for enlistment are tested for their mental aptitude. Test scores are used to classify applicants into one of five so-called categories (Category I through V). Those in Categories I and II are above average in aptitude; those in Category III are average; those in Category IV are below average, but still eligible for enlistment; and those in Category V (not shown) are at the very bottom of the scale and not eligible to enter military service. The AFQT category distributions in this table incorporate scores which were renormed to correct for calibration errors made by the Department of Defense between 1976 and 1980.

^c1964 was the last peacetime year before the war in Vietnam.

^dThe greatest influx of new recruits during any one-year period since World War II occurred in 1966.

^e1973 was the first year of the All-Volunteer Force. (The last draft call was issued by the Selective Service System in December 1972.)

SOURCE: AFQT category distributions for 1953 through 1973 were derived from data found in Bernard D. Karpinos, *Male Chargeable Accessions: Evaluation by Mental Categories (1953-1973)*, SR-ED-5-18 (Alexandria, VA: Human Resources Research Organization, January 1977). All other distributions were derived from data provided by the Defense Manpower Data Center, Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics.

The Civilian Testing Experience

As Klineberg (1944, p. 28) points out, it is "customary" to start the discussion of racial differences in measured intelligence with the comprehensive studies conducted on Army recruits in 1917 and 1918. However, there were several previous attempts to measure racial differences—beginning in 1897 with the administration of memory tests to white and black children in Washington, D.C. public schools. The earliest comparisons of white and black children, Tyler (1956, p. 283) notes, were made on the basis of school surveys to identify backward children. When the Binet tests of intelligence became available, interest shifted to comparisons of supposedly similar groups of black and white children on the basis of these tests. Some attention was

given to factors such as socioeconomic background, culture, educational opportunities, language facility, rapport with the experimenter, speed of response, and motivation, observes Klineberg (1944, pp. 34-35); but the tendency in the early studies was to "regard groups as reasonably well equated for these various factors, and consequently to accept the test results as a measure of native differences." 17

Both Tyler (1956) and Anastasi (1958) offer well-balanced accounts of the many studies of race differences (through the mid-1950s) and the various possible interpretations of results. However, as Tyler (1956, p. 283) observes, it is "unnecessary to cite many of them [i.e., studies] since they show a remarkable unanimity of findings"—that is, the average IQs for black children "practically always fell at least 9 or 10 points below those of white comparison groups." There is "no question about the existence of these differences and no doubt about their statistical significance," the author (1965, p. 306) adds in a later edition of her classic textbook: "On both individual and group tests, the averages for Negro and white children of all ages from the preschool age on up, and the averages for adults tested during both World Wars have consistently been found to differ by 10 to 20 IQ points, and fewer than 25 percent of the Negro group have typically scored above the median for whites."

Dreger and Miller (1960; 1968) commence where Tyler and Anastasi end in a review of psychological studies comparing blacks and whites in the United States from 1959 through 1965. The Dreger and Miller (1968) section on "intellectual functioning" alone includes over 80 citations of research literature covering the "equalitarian dogma," general and specific abilities, heredity and general intelligence (specific factors), and intelligence in age-level and other populations. In the history of racial comparisons, the authors (p. 46) conclude, "intellectual functioning has been of primary concern and has continued in the review period to generate heated debate, especially over the 'equalitarian dogma'." The authors (pp. 46-47) continue:

Substantively, newer studies in the factor-analytic tradition indicate that some specific abilities are more subject to genetic determination than others; at present, for the most part, we cannot pinpoint which specific abilities are genetically determined by race. Whatever genetic factors may be involved, however, some specific abilities show up, as we have suggested they would, with differential racial patterns—for example, reasoning and spatial factors which are higher in middle-class Negro children of early school age than in lower-class white children, but lower than in middle-class white children, while verbal and numerical factors, lower in lower-class Negro children than in middle-class white children, are about the same in both lower-class groups.

The classic study of white-black differences in mental test performance is *The Testing of Negro Intelligence* (2nd Edition) by Audrey M. Shuey (1966). Shuey reviews and summarizes research pertaining to the intelligence (as measured by standard intelligence tests) of American blacks over a span of more than 50 years. The review comprises approximately 380 original investigations of black intelligence (using 61 different tests of intelligence), included in 48 published monographs, books or sections of books, 203 published articles, 90 unpublished Master's Theses, 35 unpublished Doctoral Dissertations, and four other unpublished monographs; as well as 62 reviews pertaining to the topic, and 122 books, articles, and monographs dealing with material related to the use or application of the tests. 18

Simply stated, Shuey finds that, at each age level and under a variety of conditions, blacks (on the average) regularly score below whites (on the average). Table 4 depicts the combined mean IQs as reported in the numerous studies of children and students examined by the author. ¹⁹ It can be seen that the overall range of difference in average IQ scores between black and white subjects in these studies is 13 to 16 IQ units. Not shown in the table is the amount of "overlap"—or the percentage of scores by blacks that equaled or exceeded the median or mean test score of the compared white group. Using the combined data of 37 studies of school children, 23 studies of high school students, and eleven studies of college-level students, Shuey calculated an average amount of overlap of 11 percent. ²⁰ Shuey (p. 501) also found that variability was greater among the white than among the black subjects examined: where standard deviations were reported, white subjects proved to have been the more variable in 67 percent of the 200 comparisons, blacks were more variable in 26 percent of the comparisons, while there was no "appreciable difference" in the remainder. ²¹

Table 4

Combined Mean IQs as Reported in Studies of Black and White Population Subgroups Between 1922 and 1965

Population Subgroup	Combined Mean IQs as Reported in Studies ^a			
	1922-1944		1945-1965	
	Black	White	Black	White
Young Children (2-6 Years)	96	105	91	107
School Children (Individual Tests)	85	99	82	96
School Children (Non-Verbal Group Tests)	83	99	88	101
School Children (Verbal Group Tests)	85	98	83	99
High School Students	86	97	83	102
TOTAL	87	100	85	101

^aCombined mean IQs incorporate the results of different tests (i.e., expressed in IQ units) reported in numerous studies which have appeared in the literature between 1922 and 1965. The following total number of studies are included: young children, 17 studies; school children (individual tests), 43 studies; school children (non-verbal group tests), 41 studies; school children (verbal group tests), 103 studies; high school students, 55 studies. The tests were administered to a combined total of 110,875 black subjects. The number of white subjects is not reported here; however, it should be noted that not all studies included whites.

SOURCE: A.M. Shuey, *The Testing of Negro Intelligence*, 2nd Edition (New York: Social Science Press, 1966), pp. 491-495. (Combined mean IQs are reported in this table as they appear in the source.)

Shuey notes that blacks have been reported as earning their best scores in tests identified as "purposeful, practical, and concrete." And they have been reported as achieving their lowest scores in tests that involve logical analysis, abstract reasoning.

and certain perceptual-motor functions. Finally, Shuey (pp. 520-521) sums up her review of white-black differences with a "concluding statement" contained in a single sentence:

The remarkable consistency in test results, whether they pertain to school or pre-school children, to children between ages 6 to 9 or 10 to 12, to children in Grades 1 to 3 or 4 to 7, to high school or college students, to enlisted men or officers in training in the Armed Forces—in World War I, World War II, or the post-Korean period—to veterans of the Armed Forces, to homeless men or transients, to gifted or mentally deficient, to delinquent or criminal; the fact that differences between colored and white are present not only in the rural and urban south, but in the border and northern states; the fact that the colored pre-school, and high school pupils living in northern cities tested as far below the southern urban white children as they did below the white in the northern cities; the fact that relatively small average differences were found between the IQ's of northern-born and southern-born Negro children in northern cities; the fact that Negro school children and high school pupils have achieved average IQ's slightly lower in the past twenty years than between 1921 and 1944; the tendency toward greater variability among whites; the tendency for racial hybrids to score higher than those groups described as, or inferred to be, unmixed Negro; the evidence that the mean overlap is between 7 and 13%; the evidence that the tested differences appear to be greater for logical analysis, abstract reasoning, and perceptual-motor tasks than for practical and concrete problems; the evidence that the tested differences may be a little less on verbal than on non-verbal tasks; the indication that the colored elementary or high school pupil has not been adversely affected in his tested performance by the presence of a white examiner; the indication that Negroes may have a greater sense of personal worth than whites at least at the elementary, high school, and college levels; the unproved and probably erroneous assumption that Negroes have been less well motivated on tests than whites; the fact that differences were reported in practically all of the studies in which the cultural environment of the whites appeared to be similar in richness and complexity to that of the Negroes; the fact that in many comparisons, including those in which the colored had appeared to best advantage, Negro subjects have been either more representative of their racial group or more highly selected than the comparable whites; all taken together, inevitably point to the presence of native differences between Negroes and whites as determined by intelligence tests.

Two additional studies of white-black differences deserve special mention, if only for the fact that they are cited so often in the literature. Baughman and Dahlstrom (1968)—in what has been called "one of the most comprehensive and methodologically sound research undertakings in this area" (Matarazzo, 1972, p. 341)—examined school children in Millfield, North Carolina during 1961-1962 and discovered that the average IQs (Stanford-Binet) of black children were about 13 points

lower than the average IQs for similar-age white children (84.6 as compared to 97.8 for whites). Kennedy et al. (1963), using 1,800 black children from 15 county school systems in five Southeastern states, found that the mean IQ of black children was 80.8 (standard deviation of 12.4). The authors compared this finding with the 1960 normative sample of white children (based on a revision of Terman and Merrill [1937]) where the mean IQ was 101.8 (standard deviation of 16.4). Although the Kennedy et al. mean for black children in this area of the country is about 5 IQ points below the best estimates of the national average for blacks (and the standard deviation is also slightly low), the study is frequently cited in the literature since it contains the only published data that show the full form of the IQ distribution in a large random sample of blacks. 22

Jensen (1980), perhaps, best summarizes what is currently known about the form of the IQ distribution in the black and white populations in the United States (irrespective of causative factors or other correlates). "Standardized intelligence tests of practically every description," Jensen (1980, p. 98) writes, "show an average white-black difference of very close to one standard deviation, with over 90 percent of the published studies reporting differences between 2/3 standard deviation and 1-1/3 standard deviation, which on the IQ scale (with a standard deviation equal to 15) is between 10 and 20 IQ points, with a mean of 15 points difference." There are regional variations; however, these variations are similar for blacks and whites, so that the 15-point IQ difference is fairly constant from one region to another. 23

ETHNIC DIFFERENCES 24

Interest in ethnic or nationality differences coincided with the great wave of immigration into this country during the period following World War I. Henry H. Goddard, for example, at the invitation of the U.S. Public Health Service, administered IQ tests to immigrants (through translators) entering at Ellis Island and discovered that over 80 percent of his subjects were "feeble-minded" (see Kamin, 1974).

A few years later, after the Army Alpha test results were made available, there was a new flurry of research on the comparative abilities of immigrant groups. Under the editorship of Robert M. Yerkes, the data were analyzed and seen to show distinct differences by country of origin. "The Latin and Slavic countries stand low," the authors concluded. At the same time, men from Poland had the worst scores—at about the same level as American blacks (Kamin, 1976, pp. 377-378).

In 1923, Carl C. Brigham reanalyzed the Army data and ranked the various nationalities in order of intelligence—virtually dismissing the discovery that a correlation existed between test scores and years of American residence. (Brigham [1930] later retracted the conclusions of his earlier work.) Brigham's study, along with similar research by his contemporaries, figured prominently in the passage of new immigration laws in 1924 that restricted the number of immigrants and created national origin quotas.

Subsequent studies of American ethnic groups in the 1920s found mean IQs of 85.6 for Slovaks, 83 for Greeks, 85 for Poles, 78 for Spanish, 84 for Portuguese, a range of 85 to 77.5 for Italians, and 85.5 for southern Europeans as a group (see Sowell, 1976, p. 207). As Sowell (1978) observes, the overwhelming weight of professional opinion at the time supported the view that genetic factors accounted for differences both among European groups and between the new immigrants and American citizens.

In 1944, Klineberg (p. 35) catalogued the results obtained from the application of a variety of tests (in separate studies) to several ethnic groups. The results, displayed

in Table 5, show that several groups (English, Scottish, German, Jewish, Chinese, and Japanese) received test scores in close proximity with white American norms. American Blacks and Indians, Italians, Portuguese, and Mexicans scored, on average, below the norm. "Among these latter groups," Klineberg (1944, p. 35) observes, "the differences are not marked, but on the whole the American Indians tend to obtain the lowest scores, with the Negroes definitely above."

Table 5

Summary Table of Ethnic Group Differences in IQ

Ethnic Group	Number of Studies	IQ Range	Median IQ
American White (Control Groups)	18	85-108	102
Jewish	7	95-106	103
German	6	93-105	100.5
English and Scottish	5	93-105	99
Japanese	9	81-114	99
Chinese	11	87-107	98
American Black	27	58-105	86
Italian	16	79-96	85
Portuguese	6	83-96	84
Mexican	9	78-101	83.5
American Indian	11	65-100	80.5

SOURCE: Extracted from Otto Klineberg, ed., Characteristics of the American Negro (New York: Harper and Brothers Publishers, 1944), p. 35.

The vigor and volume of scientific research on the topic of ethnic differences (or race differences other than those between whites and blacks) subsided greatly in later years as scientists began to criticize the utility of existing tests and the problem of language handicap. Tyler (1956, p. 303; 1965, p. 325) refers to several studies of the American Indian which show that "Indian averages [on IQ tests] are considerably below white averages on tests involving a high degree of abstraction and the understanding of verbal concepts. In tests involving reasoning in terms of concrete materials and manipulation of spatial relationships there is some evidence that the two races do not differ." ²⁵ Investigations of Chinese and Japanese intelligence, on the other hand, have demonstrated little difference between the average IQ scores of these groups and those of whites—even in spite of language handicaps (Tyler, 1956, p. 304). "The fact that Oriental children can be expected to do about as well as American children in school work," Tyler (1965, p. 326) thus states, "is the principal practical conclusion which is justified." (Although there is obviously substantial variability on the level of the individual, notes the author.)

A more recent study by Lesser et al. (1965) examines the interrelationship of socioeconomic class and ethnicity to the measured intelligence of first-grade children from four cultural subgroups (Chinese, Jewish, black, and Puerto Rican) in New York City. The finding most often cited from this study is that Jewish and Chinese children scored significantly higher (about 10 points) than black and Puerto Rican children on each of four subscales of mental ability (verbal ability, reasoning, number facility, and space conceptualization). A second study by Stodolsky and Lesser (1967) replicated the original research effort in the city of Boston. The same measures were applied, and the results were similar: characteristic patterns of performance were found among the four ethnic groups; and, even though levels of performance varied in relation to social class differences, basic pattern characteristics of the ethnic groups were still apparent.

During the 1969-1970 school year, "Project Access" scientists conducted a similar study of the patterns in test performance by high school students of four ethnic identities (Oriental, white, Mexican-American, and black) in Los Angeles (see Flaughner, 1971A). The Project Access researchers found that "the patterns of test performance . . . were surprisingly similar to those from two previous studies of first-grade children [by Lesser] . . ." (Flaughner, 1971A, p. ii). There was, for example, a distinct and consistently higher mean test performance by Orientals and white subjects of both sexes; and, partially replicated, was the finding that levels of performance varied in relation to social class, while score patterns remained basically constant within ethnic groups (see also Flaughner, 1971B).

A comparison of the intelligence test scores of school children from different ethnic backgrounds can also be found in the "Coleman Report" on *Equality of Educational Opportunity* (Coleman et al., 1966). "With some exceptions, notably Oriental Americans," the report (p. 21) states, "the average minority pupil scores distinctly lower on these tests [intelligence and scholastic achievement] at every level than the average white pupil." The median intelligence test scores (with a national average of 50 points and a standard deviation of 10) of first and twelfth graders in the several ethnic groups were found (Coleman et al., 1966, p. 20) to differ in the following manner:

Ethnic Group	1st Grade Pupils		12th Grade Pupils	
	Non-Verbal IQ	Verbal IQ	Non-Verbal IQ	Verbal IQ
White	54.1	53.2	52.0	52.1
Black	43.4	45.4	40.9	40.3
American Indian	53.0	47.8	47.1	43.7
Puerto Rican	45.8	44.9	43.3	43.1
Mexican-American	50.1	46.5	45.0	43.8
Oriental	56.8	51.6	51.6	49.6

An apparent "gap" was thus observed in the first grade and found to persist through the school years (Coleman et al., 1966; see also Jensen, 1973, pp. 243-254). ²⁶ As Mosteller and Moynihan (1972, p. 15) write in a review of the "Coleman Report," "this range of achievement between ethnic, racial, and, by implication, class groups in the United States was a matter generally understood. The [report] strengthened the knowledge explicitly and quantitatively and demonstrated the important fact that the differences were to be found at all grade levels, and in approximately the same degree."

A recent study of ethnic group IQs by Sowell (1978) provides an interesting view of performance-level changes over time. Sowell collected more than 70,000 IQ records from schools around the country, including data on twelve ethnic groups, which extended back over a period of up to 50 years. These data were then compared with existing records on mental test scores of ethnic groups between 1915 and 1925. The results of this study suggest that the mean IQs of certain European immigrant groups (German, Irish, Italian, and Polish) have all risen over time; the mean IQ of the Jewish group has remained stable at a point somewhat above the national average; and the mean IQs of Oriental-Americans have tended to equal or exceed the national average. The results also suggest that the mean IQs of Mexican-Americans and Puerto Rican migrants are below the national average, with no evidence of change over the period examined.

The mean IQ of black Americans was likewise found to be below the national average yet similar to the mean IQs of European immigrant groups "at a similar stage of their socioeconomic development"—and "no different from those [mean IQs] of other disadvantaged minorities, past or present." Sowell (1978, p. 216) thus concludes that the relatively static historical pattern of black mean IQs is similar to the IQ distributions of Mexican-Americans and Puerto Ricans; and, that this unchanging pattern parallels the relatively static socioeconomic position of blacks (in relation to whites) which did not even begin to improve until the mid-1960s. "The large rises in IQ scores (20 points or more) over the decades as the past disadvantaged groups rose socioeconomically," Sowell (1978, p. 229) asserts, "supply an answer to the question which Arthur Jensen asked in the title of his celebrated article, 'How Much Can We Boost IQ and Scholastic Achievement?'"

Matarazzo (1972, p. 351) offers a related view of ethnic differences in terms of IQ:

For the present this writer's conclusion is that differences in the mean educational level, earned annual income, and a multitude of related factors . . . preclude any serious attempt at our present stage of knowledge to relate national origin and IQ. In this writer's opinion the case simply has not been made at the usual levels of scientific acceptability that nationality, per se, and IQ are related.

SOCIAL CLASS DIFFERENCES

As Jensen (1980, p. 367) notes, the question of "cultural bias" in mental tests arose shortly after the first practical test of intelligence was introduced in 1905. Although Binet never formally researched questions concerning observed social class differences, he did recognize that language, cultural background, and experiential factors were important "vehicles" for the measurement of intelligence. And he did attempt to minimize social class bias in the second revision of the Binet-Simon scales in 1911.

Many scientists have since reported social class differences in numerous studies, and many have speculated as to the causes of the observed differences. In fact, as Tyler (1965, p. 333) observes, "from the early days of the intelligence-testing movement to the present, one investigator after another has reported consistent differences between the average IQs of groups at different socioeconomic levels." Thus, finds Tyler (1965, p. 336), "the relationship of measured intelligence to socioeconomic level is one of the best documented findings in mental-test history."

Army psychologists during World War I, for example, discovered a hierarchy of average scores on the Army Alpha—ranging from men in preservice professional occupations (e.g., engineer and accountant) at the top, to men who worked as farmers and laborers (in preservice jobs) at the very bottom of the scale. AGCT scores from World War II revealed a similar pattern of occupational differences: white enlisted men in the professions (e.g., accountant, lawyer, engineer) generally performed best, followed, in order, by office workers and business workers and businessmen, men in skilled trades, semi-skilled workers, and unskilled workers. 27

When children are classified on the basis of their father's occupations, Anastasi (1958, p. 517) adds, the same sort of differentiation in test scores is apparent. Children of parents in the professions generally average highest—followed by a similar hierarchy of occupational skills—with children of day laborers and unskilled workers at the bottom end of the scale. 28

Other measures of social class, such as scales and indices of socioeconomic status (SES), have also been employed in studies of subpopulation differences. In general, however, studies that have examined social class differences—regardless of the particular scale used to measure social position or socioeconomic status—are consistent: adults and children (above two or three years of age) from more-privileged homes perform better, on the average, than those from less-privileged homes (see Anastasi, 1958, pp. 515-522; Tyler, 1956, p. 321; Tyler, 1965, p. 344).

Matarazzo (1972, pp. 294-295) writes that the voluminous literature on IQ and socioeconomic status can thus be summarized rather succinctly: "The correlation between IQ and socioeconomic status as defined by any of a variety of these indices of SES is in the neighborhood of 0.40. This correlation is only slightly lower than the correlation of 0.50 we described above between IQ and academic success and between IQ and occupational attainment." 29

Jensen (1969, p. 153) also places a similar measure of correlation on the relationship between SES and children's IQs in his summary of the literature:

It is well known that children's IQs, by school age, are correlated with the socioeconomic status of their parents. This is a world-wide phenomenon and has an extensive research literature going back 70 years. Half of all the correlations between SES and children's IQs reported in the literature fall between 0.25 and 0.50, with most falling in the region of 0.35 to 0.40. When school children are grouped by SES, the mean IQs of the groups vary over a range of one or two standard deviations (15 to 30 IQ points), depending on the method of status classification. . . . This relationship between SES and IQ constitutes one of the most substantial and least disputed facts in psychology and education. 30

OTHER SUBPOPULATION DIFFERENCES

There are several other "dividing lines" of test performance within the general population. Another area of investigative interest—and also related to the relationship between age and intelligence test scores—is educational attainment. Matarazzo (1972, p. 289) reports that there is a "ubiquitous correlation" of about 0.70 (r) which so often appears in studies of the relationship between the IQ scores of adults and the number of years of formal education (see Note 29 below).

Both Jensen (1980, pp. 333-334) and Tyler (1956, pp. 113-116) point out that there are important methodological problems involved in using years of formal schooling as an objective measure for comparison. Three major problem areas in studies of this nature are differences in the quality of education (from region to region, generation to generation, school to school, and so on), the isolation of education variables, and the interrelationship of educational attainment with other group differences.

One of the more interesting subjects of research has involved the attempt by various scientists to establish the "IQ requirements" of educational attainment. Cronbach (1960, p. 174) has combined material from several of these sources and arrived at the following "expectancies at various levels of mental ability":

<u>IQ</u>	<u>Expectancy</u>
130	Mean of persons receiving a Ph.D.
120	Mean of college graduates
115	Mean of freshmen in a typical 4-year college
110	Mean of high school graduates (has 50-50 chance of graduating from college)
105	Has 50-50 chance of passing in academic high school curriculum
100	Average for total population
75	Has 50-50 chance of reaching high school

Tyler (1965, p. 76) similarly writes that "long-term predictions from intelligence test scores also lend some support to the conclusion that the tests measure basic educational aptitude. A number of studies have shown that if school attendance laws are such as to permit students to drop out after their fourteenth or even their sixteenth birthdays, intelligence tests given in grade school will predict with a fair degree of success how far up the educational ladder different students will go. Those who drop out at the ninth grade level average lower than those who reach the twelfth grade. Those who attend college average higher than those who stop with high school graduation." However, Tyler (1965, p. 76) adds, "the interpretations we make must always be in terms of probabilities. It is unlikely that a boy with an IQ below 100 will be able to graduate from college. It is improbable that a person with an IQ below 125 will succeed at a first-rate graduate school."

Of course, the basic assumption here is that measured "intelligence" is less a product of the amount or quality of schooling as it is a predictor or indicator of the probability that a certain level of education (or competence) will be achieved by adulthood. In fact, "correlations reported between group intelligence tests . . . and standardized measures of school achievement often run as high as .8. This fairly close relationship between intelligence, especially as evaluated by group tests, and school-achievement tests, has at times led psychologists to conclude that intelligence tests were nothing but tests of schooling" (Tyler, 1965, p. 75). Achievement tests are, by definition, expected to measure "learned" abilities. (Although there are large differences in respect to what individual students know and how they perform on these tests at all school levels.) Yet, as Tyler (1965, pp. 75-76) further notes, "equal education does not tend to eradicate these differences." Test scores thus appear to reflect something more basic than the influence of formal schooling—that is, perhaps, "the capacity for profiting by education."

Despite the problems associated with the use of education measures, writes Jensen (1980, p. 334), "there is still a quite substantial correlation between IQ and amount of

schooling." This statement is supported by the findings of numerous longitudinal analyses. Nevertheless, Block and Dworkin (1976, p. 441) maintain that the usually high estimates of correlation between IQ and schooling are mainly a result of one or another sort of artifact. In fact, they suggest, the relationship between IQ and schooling is largely noncausal and thus useless for validation.

Another area of subpopulation differences is seen in comparisons of groups by geographical location. It is noted above (in the section on "Race Differences") that regional variations in test performance are quite commonly recorded. Jensen (1980, p. 98), for instance, describes this variation as an "increasing gradient of mean test performance that fans outward from the deep South to the North and West" (see also Shuey, 1966, pp. 499-500).

Of course, regional differences are greatly affected by factors related to urban and rural environments. And it is the relationship of intelligence test scores to urban-rural differences which has captured the interest of most investigators in this area of research. In 1956 and, again, in 1965, Tyler (1956, p. 333; 1965, pp. 355-356) offered the following summary of literature on the subject:

In accounting for urban-rural differences, then, no one type of explanation seems to account for all the facts. It seems more reasonable to conclude that a combination of causes has produced the findings. Many tests probably penalize rural children to some extent. . . . Some selective migration has been shown to occur. Marked educational deficiencies have been shown to characterize some rural regions, and their relationship to lowered test scores at the older ages has been well documented. We can sum up by stating that country children, almost everywhere they have been tested, obtain lower averages on intelligence tests than do city children. There seems to be no simple explanation for this fact.

"There is no argument among social scientists as to the existence of urban-rural differences in test scores," Tyler (1956, p. 328; 1965, p. 351) adds; "the controversy centers around what they mean" (see also Anastasi, 1958, pp. 525-529).

This observation is still true today. On the Wechsler Adult Intelligence Scale (WAIS) standardization, persons from urban areas attained scores higher than persons from rural areas on both verbal and performance tests, without exception, for all age groups between 16 and 64 years (see Matarazzo, 1972, p. 226). The mean test scores and standard deviations on the WAIS national sample showed the following differences by urban-rural areas:

Area of Residence	Number of Subjects	Verbal		Performance		Full Scale	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Urban	1098	60.90	14.94	47.60	12.05	108.50	25.04
Rural	558	54.33	14.32	43.49	12.03	97.82	25.46

The Full Scale scores show a difference of approximately one-half standard deviation between urban and rural test-takers—and this approximate difference holds true on the national sample for most age groups. "The differences observed may be variously interpreted," states Matarazzo (1972, p. 227), "but are perhaps best accounted for by selective operation of associated occupation and education." Another popular explanation among proponents of the "hereditarian" argument is that regional differences reflect the selective migration patterns of persons with different ability levels (Shuey, 1966, pp. 467-490). Whatever the causes (including obvious variations in socioeconomic environments and associated cultural factors), the same results have been found repeatedly in a wide variety of studies in many parts of this country as well as in Europe.

The relationships between test performance and numerous other characteristics of the general population have been investigated over the years. For example, studies of the correlation between mental capacity and physical characteristics were once quite common (see Wissler, 1901; and Peterson, 1930). Physical stature, body weight, head measurement and brain size, hand configuration, wrist and ankle size, physical growth and condition, myopia, and other physical characteristics (as well as physiological factors) have all served as subjects for analysis. In 1930, Paterson (p. 318) studied the correlation between physique and intellect, and concluded that "prevalent notions regarding an intimate relation between bodily traits and mental development have been greatly exaggerated."

Nevertheless, the search for physical measurements which will predict intellectual ability still goes on. Jensen (1980, pp. 361-362), for instance, cites several recent studies in which anthropometric and physiological measurements—such as brain size, brain waves, body height and weight (within sex), basal metabolism, and myopia—have been "shown" to have "small to moderate correlations" with measured intelligence. It is generally held that most indices of physical characteristics display no relationship to measures of intelligence (Anastasi, 1958, p. 151). Yet, a few have demonstrated a small but consistent relationship to intelligence measures in a number of independent studies over the course of several years (see Matarazzo, 1972, pp. 319-322).

CONCLUDING NOTE

In every discussion of the observed differences of a specific subpopulation, Tyler (1956; 1965) makes a special effort to point out "one all-important fact"—namely, that a difference between group averages tells nothing about the individuals within any group. There is, in effect, wide variability within each of the subpopulations for which differences are found. This is especially true for measures of mental ability, where there is usually a relatively greater mean variation within any one group than the mean differences between any two groups (e.g., the measured differences between individuals of the same race exceed in magnitude the average differences between separate races).

Eysenck (1971, pp. 105-106) also criticizes the common use of the concept of "overlap" (see above section on "Race Differences"). He stresses, in particular, that the "overlap" statistic tends to exaggerate the "inferiority" of the test scores of blacks. The overlap in the sense of distribution coincidence is quite large, Eysenck (1971, p. 106) adds—only a minute proportion of blacks score lower than the lowest white, and only a small proportion of whites achieve test scores which are better than the highest-scoring black.

It would seem that the term "overlap," used in the technical sense, is indeed misleading and gives the impression of Negro

inferiority in no way justified by the facts. Naturally, writers are entitled to use descriptive statistics in any way they like; but there is no obvious advantage to the "overlap" concept as opposed to the much more widely used standard deviations. . . .

And, in terms of numbers alone, it is interesting to observe that many more whites score below the black mean than there are blacks in the entire national population.

Another important point concerns the fact that there is, obviously, a great deal of interaction and crossover between the subpopulation categories identified in this paper. For example, racial or ethnic groups can be subdivided into categories of sex, social class or socioeconomic status, age, geographic location, and/or education; males and females can be subdivided as well into categories of race, ethnic group, social class, age, geographic location, and/or education; and so on. Since no separate subpopulation is completely insulated, interrelationships of population characteristics will occur and frequently alter the magnitude and direction of observed differences.

The interrelationships of race and geographic location and race and socioeconomic status have received considerable attention over the past few years. Shuey (1966, p. 520), for instance, analyzed the various studies of whites and blacks which controlled for socioeconomic status. The extent of possible crossover can be seen in her calculations of the combined mean IQs for these groups: 31

Race	Combined Mean IQs		
	Socioeconomic Status		Difference
	Upper	Lower	
White Children	111.88	94.22	17.66
Black Children	91.63	82.04	9.59
Difference	20.25	12.18	--

The entire study of IQ differences between groups, as well as intelligence testing in general, is currently embraced by controversy. 32 However, as Jensen (1980, p. 737) states, tests only reveal differences; they do not create differences, nor do they explain causes:

Whatever the causes of the statistical differences between the test scores of various racial groups within the United States, the preponderance of evidence leads to the conclusion that the tests themselves do not contribute to the differences. . . . Once the point has been determined for any standard test, through empirical investigations such as those reviewed in this book, and the proper uses and limitations of the test are duly noted, the psychometricians and the test publishers should be under no obligation to explain the causes of the statistical differences between groups.

The search for causes, Jensen (1980, p. 737) continues, is an "awesomely complex task" which requires the collaborative efforts of individuals from several specialized fields of science (biological as well as behavioral) in addition to psychometrics. Nevertheless, there are still serious and unanswered questions concerning standardized tests. And because of the importance of tests in our society, it is both the challenge and continuing responsibility of testing research to find and explain the causative factors of group differences.

NOTES

1. The practice of eliminating some items and counterbalancing others to minimize any sex differential is based on the assumption that there is no true difference in general intelligence between the sexes. The intent, then, is to reduce (or eliminate entirely) any effects of environment or heredity that might tend to make boys superior in some kinds of test and girls superior in others. See, for example, McNemar (1942) for a discussion of the revisions aimed at reducing sex differences on the Stanford-Binet Scale.
2. Jensen (1980, p. 625) writes: "The sex difference in verbal ability after puberty appears to be a genuine phenomenon and not just a measurement artifact."
3. The researchers originally had no expectations of finding sex differences. When sex differences first appeared in 1972, they were "surprised"; when differences appeared again in later years, they reportedly were "shocked" at the consistency of the results (see Kolata, 1980, p. 1235).
4. Benbow and Stanley (1980, p. 1264) continue: "This male superiority is probably the result of both endogenous and exogenous variables. We recognize, however, that our data are consistent with numerous alternative hypotheses."
5. Richard Lewontin, a biologist and participant in the "nature-nurture" debate, points out that the average male-female difference in math scores is only "half a standard deviation" and "that's rather small." The dispute over the comparative mathematical abilities of the sexes, he observes, is "just silly"; and statements about "who's most aggressive or who's most analytical are just the garbage can of barroom speculation presented as science." (See "Just How the Sexes Differ," *Newsweek*, 18 May 1981, p. 83.)
6. The Army Alpha test was a verbal, group-administered intelligence test used by the U.S. Army for the selection of draftees and assignment of recruits during World War I. The test consisted of eight subtests—including verbal ability, numerical ability, ability to follow directions, and information—and served as a prototype for several subsequent group-administered IQ tests. The Army Beta test was the non-verbal, group-administered counterpart to the Army Alpha test. It was used to evaluate the aptitude of illiterate, unschooled, or non-English-speaking draftees. The Army Beta test is recognized as one of the first important nonlanguage paper-and-pencil tests (items of which still appear in some present-day IQ tests).
7. "Further reports based on longitudinal studies will be eagerly awaited," Tyler (1956, p. 350) writes. Actually, intellectual decline after the age of about 20 was "a universally accepted conclusion held almost sacred by psychologists since the time of Terman's 1916 revision of the Binet" (Matarazzo, 1972, p. 109).

8. It should be noted that there is widespread disagreement among biologists, anthropologists, psychologists, sociologists, and others over the nature and use of classifications of "race." The term "race" is applied in many contexts; it is defined both formally and informally in numerous fashions; and it has at least four common usages: (1) biological or physical anthropological; (2) mystical or "romantic"; (3) formal/legal or administrative; and (4) social.

Because of confusion, ambiguity, muddled definitions, and a history of misuse, some scientists advocate complete abandonment of the term (and associated concepts) in favor of "ethnic groups" or some other "noncommittal" phrase (see Ashley Montagu, 1964, pp. 372-380). Others find that substitution of terms is impossible, since "race" is so much a part of the scientific literature and the language of our society. "Race is an explosive term," Berry and Tischler (1978, p. 23) write. "Our language does have its full quota of 'loaded' words . . . ; but when it comes to arousing people's prejudices, loyalties, animosities, and fears, none is the equal of race. . . ." The authors (p. 42) add: "However, we can bear in mind that race has both a biological and a social meaning, and that it is the latter that takes precedence in the affairs and thinking of most of us." The *International Encyclopedia of the Social Sciences* (1968, p. 263) similarly observes that "race engages the attention of social scientists as a special constellation of cognitive or ideological categories and as a means of explaining sociocultural phenomena." The "evaluation of the relevance of racial differences to sociocultural theory," the *Encyclopedia* points out, "thus becomes an inescapable obligation of the social sciences."

It is far beyond the scope of this paper to discuss the merits of the concept of race. (There is already a vast and yet growing body of literature on the subject.) It is important only to note here that concepts and typologies based on racial distinctions form a major part of the literature on group differences in test performance. Studies of racial group differences in this country most frequently deal with the white and black "races" (because of relative population sizes, American history, and the sociopolitical milieu). Many comprehensive studies of population differences in measured intelligence discuss the problems associated with the use of racial classifications. Recent treatments of the issue can be found in Mead et al. (1968), Eysenck (1971), Montagu (1975), Tyler (1965), Block and Dworkin (1976), Ehrlich and Feldman (1977), as well as numerous other sources.

9. Pastore (1940) earlier suggested, on the basis of an analysis of the writings of psychologists and sociologists, that there was a conservative/liberal link (respectively) between the hereditarian and environmentalist attitudes of the scientists.
10. Historical examples can be found in Jenkins and Paterson (1961). See, for example, "Racial Differences in Mental Traits" (Woodworth, 1910) and "Nature-Nurture and Intelligence" (Leahy, 1936) in Jenkins and Paterson (1961).
11. Jensen (1973, pp. 356-369) himself has assembled a bibliography of over one-hundred articles published in response to his original study in the *Harvard Educational Review*.

12. The especially sensitive nature of the topic is evidenced in the subject index of Matarazzo (1972, p. 569). Under the subject of "Race and IQ," the author (or editor) has chosen to place a subheading for "Other potential variables which may affect IQ." Flynn (1980, p. 213), on the other hand, notes that his own reasons for boldly entering "the debate" included the desire to contribute to the "intellectual respectability of the environmentalist position." Also, Flynn adds, "Jensen threatens to dominate the debate by the range of his learning, his skill as a controversialist, and the sheer volume of his contribution." Loehlin et al. (1975, p. viii), before embarking on their study of *Race Differences in Intelligence*, comment: "One might well wonder why any behavioral scientist of good sense would willingly, or even reluctantly, become involved in the tangled morass of data, methods, ideologies, and emotions that currently surrounds the question of the relative importance of genetic and environmental variations in accounting for racial-ethnic IQ differences. In this case, it was not one behavioral scientist but three, all of whom generally consider themselves rational."
13. After 15 July 1942, Army Grade V was arbitrarily narrowed by extending the lower score limit of Grade IV an additional half standard deviation downward (from standard score 70-89 to 60-89). The standard score limits for Grade V were thus changed from 0-69 to 0-59. Although this change had no effect upon the distribution of scores, it did alter the grade distribution considerably.
14. Milton (1955, p. 10) has calculated the AGCT scores of men in the Army, by race, over the entire 1941-1946 mobilization period. The following table shows the percentage distributions of white and black soldiers during this period and in subsequent years (when entry standards were tightened):

Army Grade Classification	Score Range	Men in the Army, 1941-1950 (Percent)					
		Mar 1941-May 1946		Mar 1949		Jan 1950 ^a	
		White	Black	White	Black	White	Black
I	130 and above	6	0	4	0	4	1
II	110-129	29	3	27	7	27	8
III	90-109	33	13	36	31	40	41
IV	60-89	26	48	30	58	28	54
V	59 and below	6	36	3	4	1	6

^aIncludes regular enlisted men only.

15. See Milton (1955, p. 562).
16. It is interesting to note that the differences in mental aptitude between races have been used to justify segregation, racial restrictions, and quotas. In late 1941, Dalfiume (1969, p. 57) observes, the Army adopted more rigid literacy standards "mainly" to reduce the number of blacks who could be enlisted. Secretary of War Henry K. Stimson, however, viewed the new policy as "reacting badly in preventing us from getting in some very good illiterate [white] recruits from the Southern mountain states." In fact, the Army eventually succumbed to an abolition of the

racial quota in 1950 (officially) based on the understanding that (1) blacks could be "counted on" to score well below whites on qualifying examinations and, therefore, (2) the minimum mental aptitude standards could be manipulated, if necessary, to keep the proportion of black enlistments below 10 percent. It was the Fahy Committee who urged the Army to substitute an achievement quota for its racial quota—noting the great difference between black and white soldiers in education and performance on mental aptitude tests. The Army, it was pointed out, could adjust its General Classification Test minimum qualification scores up or down and use its physical, psychiatric, and moral standards to effectively regulate the number of black enlistments and reenlistments. See Memorandum to the President from David K. Niles, 7 February 1950, and supporting documents in McGregor and Nalty, eds. (1977, pp. 1343-1345).

More recently (in 1975 and, again, in 1979), the Navy was accused by Congress of using a disguised racial quota in the form of restrictions on the percentage of recruits who placed in the lowest acceptable category (AFQT Category IV). In 1980, Congress itself imposed a ceiling on the percentage of AFQT Category IV recruits who are permitted to enter military service between FY 1981 and FY 1983. According to some observers, the new restrictions imposed by Congress recreate a traditional barrier to blacks.

17. Later research revealed some evidence of the effect of improved environment in raising the average test scores of a group (Klineberg, 1935; 1944); the relationship between IQ and periods of time spent in Northern schools (Lee, 1951); and the consistency of IQ differences of 15 to 19 points (Tanser, 1939), 14 to 17 points (Bruce, 1940), and 9 to 12 points (Bruce, 1940) between white and black children in areas where environmental factors have been more nearly equalized.
18. Dreger (1967, pp. 50-51) writes that Shuey's study is "the most complete compendium of research anywhere on intelligence testing of Negroes and, directly or indirectly, on intelligence test comparisons of Negroes and whites." It is also, Dreger adds, "the most respectable statement of the hereditarian position with which the reviewer is familiar."
19. The combined mean IQs reported here appear in Chapter XI (Summary and Conclusions) of Shuey (1966). The author also reviewed study findings for individuals in the armed forces, college students, veterans and other civilians, deviates, delinquents and criminals, and racial hybrids. Comparative IQ scores for other groups (where available) show the following white-black differences: (1) Using a white draft frame-of-reference with a mean of 100 and a standard deviation of 16, the Army Combined Scale scores of black recruits during World War I were converted into a standard-score mean IQ of 83; (2) Six studies of special groups of veterans and other civilians revealed a black average IQ from 11 to 17 points below that of the white subjects (and from 16 to 32 points below the white norms); (3) In studies of delinquents, the combined mean IQ for blacks was 74, and the combined mean IQ for white delinquents was about 81; and (4) Black felons were found to have a combined mean IQ of 81, while the combined mean IQ of white convicts was 92.
20. Shuey (1966, pp. 501-502) notes that there is some disagreement on the median overlap observed in studies of white and black school children, high school pupils, and college students. Anastasi (1958, pp. 548-550), for example, cites an average overlap of 30 percent. And there are various other estimates (see Jensen, 1973, pp. 134, 148; Jensen, 1980, p. 87).

21. Jensen (1973, p. 211) writes: "Thus it seems well established that Negroes show less variance than do whites on mental tests. Does this mean there is less genetic variance in the Negro population, or less environment variance, or less of both? It is hard to say."
22. Another large-sample study reveals similar results. Raw score distributions for black (N=38, 452) and white (N=142, 545) job applicants, in 80 occupations throughout the country, on the Wonderlic Personnel Test (a fifty-item measure of general intelligence) show the following: (1) The mean score for black high school graduates was 15.79, and the mean score for white high school graduates was 22.29; (2) Among college graduates, the mean scores for blacks and whites of both sexes were 23.26 and 29.96, respectively. (The Wonderlic Test results are reviewed and analyzed in Jensen, 1980, pp. 99-101.)
23. The observed regional variation is, as Jensen (1980, p. 98) observes, "an increasing gradient of mean test performance that fans outward from the deep South to the North and West." Students of psychological testing—even those who disagree most ardently with Jensen and the proponents of "hereditarianism"—accept the 15-point IQ gap between white and black Americans as historically accurate (though subject possibly to change over time). See, for example, Ehrlich and Feldman (1977), Sowell (1978), and Flynn (1980); and, for a further review of evidence on this point, see Dreger and Miller (1960; 1968), Loehlin et al. (1975), and Tyler (1965).
24. This discussion of research on "Ethnic Differences" includes American Indians (Native Americans) and Orientals (as well as references to white-black racial differences). Although these particular subpopulations are sometimes classified as "races," they are treated here as "ethnic groups"—since most extant studies examine the test scores of these subpopulations in the context of "ethnic" or "national origin" groups.
25. Tyler (1956, p. 303; 1965, p. 325) also points out that "it is impossible to make any definite statement as to the source of average differences."
26. Jensen (1980, p. 479) calculated the differences between the white majority mean and minority group means, as expressed in standard deviation units, from data contained in Coleman et al. (1966, Supplemental Appendix, Section 9.10). Jensen's calculations reveal the following differences by test, grade, and ethnic group:

Test	Grade	Difference Between White (Majority) Mean and Minority Group Mean (in Standard Deviation Units) ^a			
		Black	Mexican	Indian	Oriental
Verbal IQ	3	0.68	0.64	0.67	0.41
	6	1.10	1.12	0.93	0.42
	9	1.16	0.89	0.79	0.28
	12	1.24	0.91	0.93	0.28
Nonverbal IQ	3	0.75	0.50	0.38	0.16
	6	1.12	1.12	0.63	0.30
	9	1.01	0.82	0.54	-0.01
	12	1.31	0.82	0.57	-0.04
Reading Comprehension	3	0.85	0.70	0.61	0.28
	6	0.87	0.54	0.81	0.34
	9	0.55	0.77	0.68	0.19
	12	1.05	0.85	0.64	0.25
Math Achievement	3	0.65	0.65	0.60	0.28
	6	1.07	1.00	0.93	0.38
	9	0.98	0.90	0.72	0.04
	12	1.13	0.72	0.70	0.07
General Information	9	1.18	0.95	0.83	0.26
	12	1.27	0.98	0.87	0.26
Average	-	1.03	0.84	0.73	0.25

^a Raw score means and standard deviations were used to calculate differences as follows: (white mean minus minority mean) divided by white standard deviation. This table is reprinted from Jensen (1980, p. 479).

27. It is interesting to note here the factor of individual difference within each occupational group. There is, in fact, considerable dispersion within the occupations in this study—and the IQ spread increases as one moves down the scale from the professional to the unskilled occupations (see Tyler, 1956, pp. 316-318; Anastasi, 1958, p. 516).
28. Selected studies, for example, show the following mean IQs of children (according to father's occupation) and adults:

Occupational Category	Mean IQs		
	Children	Adults	
	(15-18 yrs.)	Army Alpha (W.W. I)	AGCT (W.W. II)
I. Professional	116.4	123	120
II. Semi-Professional; Managerial	116.7	119	113
III. Clerical; Skilled Trades; Retail Business	109.6	108	108
IV. Rural Owners	94.3	97	94
V. Semi-Skilled; Minor Clerical; Business	106.7	101	104
VI. Slightly Skilled	96.2	98	96
VII. Day Labor (Urban and Rural)	97.6	96	95

SOURCE: Tyler, 1956, pp. 319-320; Tyler, 1965, p. 341; Anastasi, 1958, p. 517.

29. Tyler (1965, p. 341) finds that "correlations between socio-economic status, as measured by such scales [i.e., indices of SES], and intelligence, as measured by any of our common tests, usually turn out to be about 0.30."

Matarazzo (1972, p. 296) presents his "summary impressions from the voluminous literature we have reviewed between IQ and the adaptive behaviors discussed so far in this chapter" in a table showing the "Exemplars or Validity Coefficients of IQ." The following exemplars and coefficients are included in the summary table:

Exemplar	Coefficient (r)
<u>IQ With Adaptive Behavior Measure</u>	
IQ x mental retardation	0.90
IQ x educational attainment (in years)	0.70
IQ x academic success (grade point)	0.50
IQ x occupational attainment	0.50
IQ x socioeconomic status	0.40
IQ x success on the job	0.20
<u>Related Variables</u>	
IQ x independently judged prestige of one's job	0.55
IQ x parents' educational attainment	0.50

30. Jensen (1969, p. 153) makes a point here of noting that social class (or socioeconomic status) should be considered as a factor separate from race—since social classes cut across all racial groups. (Though, clearly, Jensen continues, different racial groups are disproportionately represented in different categories on the socioeconomic continuum.) It is also observed that matching or statistically controlling for socioeconomic status in racial samples does not eliminate race differences in IQ. In studies of white-black differences, for example, the placement of "controls" on socioeconomic status has been demonstrated to reduce the IQ differential by about one-third (Jensen, 1973, p. 358). Thus, for black and white subjects with similar SES backgrounds, the group difference, on the average, is found to decrease from 15 points (overall) to about 10 or 11 points.

31. Jensen (1980, p. 44) also writes:

The IQ difference between whites and blacks is 15 percent. Whites and blacks of the same SES [socioeconomic status] differ by 12 points. The average absolute difference among the means of SES groups of the same race is about 6 IQ points, or 9 IQ points among whites and 4 IQ points among blacks. But the average absolute difference among the means of families of the same race and SES is 9 IQ points, and the average difference among siblings in the same family is 12 IQ points (which is the same as the average IQ difference between races of the same SES).

32. Criticisms of the tests and testing situations are numerous. They include cultural bias (so as to discriminate unfairly against racial and ethnic minorities or persons of low socioeconomic status); criticisms of specific test items; problems associated with the definition and measurement of "intelligence"; the failure of tests to measure certain capacities; the use of unsuitable norms; and the contamination of test scores by extraneous factors—for example, poor rapport between test-takers and test examiners, the failure of test examiners to communicate test requirements, problems associated with the traditional testing situation, anxiety or apathy on the part of the test-taker, and deficiencies or differences in motivation, test practice, and reading skills on the part of test-takers.

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Selected references are briefly described here in order to: (a) acquaint the reader with the so-called "classic" works and a representative sample of studies in the field; (b) characterize the literature dealing with controversial aspects of group differences and intelligence testing; and (c) provide a general "road map" for those who wish to pursue further the subject of this paper.

1. **Standard Texts on Differential Psychology.** A number of texts on Differential Psychology are available. The (now) somewhat dated works by Anastasi and Tyler contain the best overall treatments of historical material and basic principles in the "science of human differences."

Anastasi, Anne. *Differential Psychology: Individual and Group Differences in Behavior* (3rd Edition). New York: The Macmillan Company, 1958. (664 pp.)

The two previous editions of this authoritative text were published in 1937 and 1949. This edition retains the fundamental objectives of the two earlier works: (1) to clarify the basic mechanisms of behavior; (2) to coordinate the various topics that have usually been joined together loosely under the caption of "individual differences"; and (3) to report the major problems of differential psychology in a form readily comprehensible to the college student (pp. v-viii). Separate chapters are devoted to age differences, sex differences, social class differences, race differences (methodological problems), race differences (major results), and other topics. The author presents an especially well-balanced account (in the historical context) of problems in measuring differences between the races.

Freeman, Frank S. *Individual Differences: The Nature and Causes of Variations in Intelligence and Special Abilities*. New York: Henry Holt and Company, 1934. (355 pp.)

This book discusses inheritance, environmental influences, race and nationality, sex, factors related to age, special abilities and disabilities, and factors related to physical development and personality. The book was written for advanced students of education and psychology and for educators and psychologists.

Freeman (p. 169) writes: "In summary, therefore, it must be said that under present social, economic, cultural, and educational conditions the average mental ability of Negroes is inferior to the average of the whites; but the available data, obtained under present conditions, have not established the existence of innate racial mental inferiority, though such may be the case. The data are consistent with, but not conclusive of, such inferiority. At present, however, the problem of genetic differences in mentality is still unresolved, as regards the white and Negro populations of the United States."

Jenkins, James J. and Paterson, Donald G., eds. *Studies in Individual Differences: The Search for Intelligence*. New York: Appleton-Century-Crofts, Inc., 1961. (774 pp.)

The editors (p. v) write: "This book of readings is designed to meet what we feel is a critical need in contemporary courses in tests and measurements and differential psychology. . . . It is our conviction that this book will supplement the standard texts in a valuable way for students with enquiring minds and an intellectual curiosity about the origins of the evidence upon which our present knowledge of intelligence rests." There are 66 representative articles—presented in chronological order—from "Classification of Men According to Their Natural Gifts" by Francis Galton (1869) through "Three Faces of Intellect" by J.P. Guilford (1959).

Tyler, Leona E. *The Psychology of Human Differences* (2nd Edition). New York: Appleton-Century-Crofts, Inc., 1956. (562 pp.)

Tyler, Leona E. *The Psychology of Human Differences* (3rd Edition). New York: Appleton-Century-Crofts, Inc., 1965. (572 pp.)

Tyler envisages the readers of her textbook as "intelligent upper-division or graduate students with at least a basic course in general psychology." She thus presents a thoroughly comprehensive, yet readable, review of the "science of human differences"—without getting into some of the more highly technical aspects of psychometrics.

The text is divided into four major sections. Tyler first examines the field of Differential Psychology, including its general principles and methods of measurement. She then reviews the varieties of individual differences and the varieties of group differences (with separate chapters on sex, race and nationality, social class, age, the mentally deficient, and the unusually gifted). Finally, the author presents a discussion of the factors that may be responsible for producing observed differences (including heredity and environment).

Tyler, Leona E. *Individual Differences: Abilities and Motivational Directions*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1974. (247 pp.)

Tyler (pp. v-vi) writes: "I have attempted to present a simple, straightforward account of what psychologists have learned about individual differences, avoiding statistical complications and methodological side issues. My first objective has been to produce a book that can be understood by persons who have not taken courses in psychology, first-year students in universities and colleges, and ordinary members of the reading public."

The book is divided into ten chapters, one of which (Chapter 3) treats the subject of "intelligence." The material is, as the author indicates (p. vi), very general in approach and aimed primarily at those who "may profit from reading an up-to-date discussion of the ways in which such assessments are now regarded." A subsection of the chapter on intelligence is devoted to "problems of race and social class."

Tyler (p. 66) writes here: "The commonly reported race and social class differences can be explained either by postulating a difference in hereditary potential or by the reaction range concept of phenotype genotype relationships."

2. **Standard Texts on Psychological Testing.** The interested reader is advised to consult the following texts as a starting point for further research:

Anastasi, Anne. *Psychological Testing* (4th Edition). New York: The Macmillan Company, 1976.

Cronbach, Lee J. *Essentials of Psychological Testing* (3rd Edition). New York: Harper and Row, 1970.

These two books (and their predecessors) present the basic principles of testing. These principles are important in understanding the potentialities and limitations of various tests and in interpreting the results of specific tests.

Goodenough, Florence L. *Mental Testing: Its History, Principles, and Applications*. New York: Rinehart and Company, Inc., 1949. (609 pp.)

This text is especially interesting because of its comprehensive approach and chronological place in the history of mental testing. (The volume reviewed here is a "first reprinting" [1969] by the Johnson Reprint Corporation.)

The author states in the preface (pp. vii-viii) that the book is planned to serve the needs of several groups. It is, first of all, "designed to serve as an orientation text for students planning to enter the field of testing" as well as a reference for clinical psychologists and psychometrists. It is also designed for "the large body of professional workers who make use of the results of tests which they do not themselves administer" (such as educators, social workers, psychiatrists, pediatricians, juvenile court judges, and the like).

The author sees "a basic defect in the scientific background of a large number of the persons at present engaged in testing"—especially in "their lack of understanding of the theoretical principles underlying the procedure, which they employ." She has "accordingly tried to indicate the nature of these principles as they apply to the actual testing of individuals. . . ."

The book is divided into four major sections: I. Historical Orientation; II. Principles and Methods; III. Tests and Scales; and IV. Applications. There are a total of 36 chapters covering a wide range of history, theory, and practice. In addition, the author has included a 25-page glossary of technical terms and a selected bibliography.

Matarazzo, Joseph P. *Wechsler's Measurement and Appraisal of Adult Intelligence* (5th Edition). Baltimore: The Williams and Wilkins Company, 1972. (582 pp.)

This is an update and revision of a basic text in clinical psychology, first published in 1939 and last revised by David Wechsler in 1958 (Fourth Edition). The present edition "constitutes a substantial departure from Wechsler's first four editions of this book" (p. vi). Only four (out of fourteen) chapters from the previous edition remain essentially unchanged (except for updating).

The book is intended for use by psychologist-practitioners, graduate and advanced undergraduate students of psychology, and other professionals in related fields (e.g., education, medicine, and social work).

The book is divided into four major sections: I. The Nature, Classification, and Assessment of Intelligence; II. Some Early and Modern Approaches to Validation; III. The Wechsler-Bellevue and the Wechsler Adult Intelligence Scales; and IV. Additional Approaches to Validation and Some Applications in Practice.

Information on group differences is presented primarily in Chapter 12 ("Validity Indices, Exemplars, and Correlates of Intelligence Test Scores"). Chapter 12 comprises about one-fifth of the entire book. "Hopefully," the author writes, "the reader of this chapter, like the writer, will conclude that he has been exposed in the material here reviewed to only the first installments of an absorbing detective story. . . ."

3. **Studies of Group Differences** (With an Emphasis on Recent Work in the Area of Race Differences)

Baughman, E. Earl and Dahlstrom, W. Grant. *Negro and White Children: A Psychological Study in the Rural South*. New York: Academic Press, 1968. (572 pp.)

This is a valuable study. Matarazzo (1972, p. 341), for example, calls it "one of the most comprehensive and methodologically sound research undertakings in this area." It is a well-documented examination of school children in Millfield, North Carolina during 1961-1962—the most-often-cited finding of which is that the average IQs (on the Stanford-Binet) of black children are about 13 points lower than the average IQs of similar-age white children (i.e., 84.6 as compared with 97.8 for whites).

Thomas Pettigrew, in the foreword, writes: "This work is significant because it attempts to right the balance in our national and psychological perspective on deprivation. *Negro and White Children* presents precisely what it states—a psychological study in depth of children in the rural South. It encompasses a broad view of the individual—intellectual, social, motivational, and temperamental factors are considered; and its measures cover the sweep of the best in present-day psychological instrumentation."

The book is divided into six major sections: I. Setting and Methods; II. Intelligence and Academic Achievement; III. Intellectual Change; IV. Personal Attributes; V. Personal Perspectives; and VI. Integration and Recommendations.

Coleman, James S. et al. *Equality of Educational Opportunity*. Washington, D.C.: Government Printing Office, 1966. (737 pp.) Also: *Supplemental Appendices to the Survey on Equality of Educational Opportunity: 9.10 Correlation Tables* (under separate cover). (548 pp.)

This is the widely discussed and controversial "Coleman Report." The report examines: (1) school environment; (2) pupil advancement and motivation; (3) future teachers of minority groups; (4) higher education; (5) nonenrollment; (6) case studies of school enrollment; and (7) special studies (e.g., Project Headstart, Vocational Education).

The appendix contains the correlation matrices used in the regression analyses presented in Section 3 of the *Educational Opportunities* report.

A very good treatment of the "Coleman Report" can be found in F. Mosteller and D.P. Moynihan, eds., *On Equality of Educational Opportunity* (Papers Deriving From the Harvard University Faculty Seminar on the Coleman Report), (New York: Vintage Books, 1972).

Dreger, Ralph Mason and Miller, Kent S. "Comparative Psychological Studies of Negroes and Whites in the United States." *Psychological Bulletin* 57 (1960): 361-402.

Dreger, Ralph Mason and Miller, Kent S. "Comparative Psychological Studies of Negroes and Whites in the United States: 1959-1965." *Psychological Bulletin Monograph Supplement* 70 (September 1968). (58 pp.)

These articles, together, review a wide variety of published psychological studies concerning whites and blacks (for the most part in the United States) from 1943 through 1965. The period chosen in the first review (1943-1958) covers work reported following the summary presented by Klineberg (1944). "Intellectual functions" is one of several separate topics treated in each of the reviews. Sub-topics in the 1968 monograph include: the "equalitarian dogma"; the feminist parallel; the Tanser study; the Pasamanick study; the cultural hypothesis; general and specific abilities, heredity, general intelligence, and specific factors; intelligence in age-level and other populations; children and adolescents; and motivational factors in intelligence testing.

Jensen, Arthur R. *Educability and Group Differences*. New York: Harper and Row, 1973. (407 pp.)

The publisher calls this a "pivotal" analysis of the genetic factor in intelligence and educability. Jensen defines "educability" as the ability to learn the traditional scholastic subjects (especially the three R's) under the ordinary conditions of classroom instruction. Jensen concludes that measured IQ is determined predominantly by factors related to heredity. Jensen (p. 1) writes: "*Educability and Group Differences* deals with the fact that various subpopulations (social classes and ethnic groups) in the United States and elsewhere show marked differences in the distributions of those mental abilities most importantly related to educability and its occupational and socioeconomic correlates. This book challenges some of the prevailing explanations of these differences, particularly those theories that involve exclusively social and psychological causative factors."

Klineberg, Otto. *Negro Intelligence and Selective Migration*. New York: Columbia University Press, 1935. (66 pp.)

Klineberg's studies are often cited in the literature. His results here show that the amount of difference between whites and blacks on intelligence tests varies considerably from one part of the country to another. Specifically, blacks in the North do much better than blacks in the South and "approximate more closely" the records made by the whites with whom they were compared (p. 1). The author's conclusion is that recorded differences are due to factors in the environment and not due to selective migration.

Klineberg, Otto, ed. *Characteristics of the American Negro*. New York: Harper and Brothers Publishers, 1944. (409 pp.)

This book brings together several of the monographs resulting from a "Study of the Negro in America," under the direction of Gunnar Myrdal and under the financial sponsorship of the Carnegie Corporation of New York.

The book is divided into six parts. Part II (written by Klineberg) is a discussion of the results obtained from experimental attempts to measure "racial" differences in performance on tests of mental ability. According to the author, the approach is similar to that undertaken in a previous work (Otto Klineberg, *Race Differences*, [New York: Harper and Brothers Publishers, 1935])—except that the current analysis is able to draw from a considerable amount of new data on the subject. It is also "a fairly complete survey of the testing of Negroes, and only an incidental analysis of the results obtained on other groups" (p. 27).

Part II is divided into four chapters: I. Introduction—Early Studies—The Results Obtained; II. Problems of Interpretation; III. Problems of Interpretation (continued); and IV. Special Approaches. In a summary statement, Klineberg (p. 81) observes that the various factors which enter into the interpretation of black-white comparisons in test scores "represent what seem at the present time to be insurmountable difficulties in the way of an objective, scientifically acceptable methodology in this field." He continues: "The complications which they [problems of interpretation] introduce must lead to the conclusion that racial differences have not been demonstrated by means of intelligence tests, since so many nonracial factors enter into the results. The tests have, however, revealed a number of differences between groups, which it is important to keep in mind in connection with any survey of the present status of the Negro. In terms of achievement of the type measured by the tests, we must state that the Negro is on the average inferior; in terms of aptitude or innate capacity, no such statement can be made."

Loehlin, John C., Lindzey, Gardner, and Spuhler, J.N. *Race Differences in Intelligence*. San Francisco: W.H. Freeman and Company, 1975. (380 pp.)

Vernon (1979, p. 262) describes this book as "certainly the most dispassionate and scholarly discussion yet written on the question of race and intelligence, its main conclusion being that there is definite evidence on both sides but that the interpretation of such evidence is beset with so many difficulties that equally reputable scientists can justify contradictory inferences from the same facts."

The book is divided into four major sections: I. Issues and Concepts; II. Empirical Evidence; III. Conclusions and Implications; and Appendices (which includes some material that extends the discussion, in the authors' words, "beyond the limited focus of the text"). The "race differences" that the authors discuss are largely differences between various racial-ethnic groups in the United States. "Intelligence" refers to performance on conventional tests of intelligence. Over 500 references were reviewed by the authors; the authors also consulted researchers in a broad range of disciplines, representatives of minority groups, and "persons familiar with public policy decisions based on scientific data."

In the final chapter (p. 238), the authors present three general conclusions concerning racial-ethnic differences:

1. Observed average differences in the scores of members of different U.S. racial-ethnic groups on intellectual-ability tests probably reflect

in part inadequacies and biases in the tests themselves, in part differences in environmental conditions among the groups, and in part genetic differences among the groups. It should be emphasized that these three factors are not necessarily independent, and may interact.

2. A rather wide range of positions concerning the relative weight to be given these three factors can reasonably be taken on the basis of current evidence, and a sensible person's position might well differ for different tests.
3. Regardless of the position taken on the relative importance of these three factors, it seems clear that the differences among individuals within racial-ethnic (and socioeconomic) groups greatly exceed in magnitude the average differences between such groups.

Maccoby, E.E. and Jacklin, C.N. *The Psychology of Sex Differences*. Stanford, CA.: Stanford University Press, 1974. (634 pp.)

The Psychology of Sex Differences assembles a large body of evidence concerning how the sexes differ and do not differ in terms of psychological functioning (i.e., intellectual performance and social behaviors that are not specifically sexual but have been thought to be differentiated by sex). The book is divided into three major sections: I. Intellect and Achievement; II. Social Behavior; and III. On The Origins of Psychological Sex Differences.

The review of literature includes an annotated bibliography of over 1,400 recent studies of sex differences (published between 1965 and 1975). The "summary tables" are well-designed and serve as a valuable reference. (The book itself is a sequel to an earlier volume, *The Development of Sex Differences*, edited by Maccoby and published in 1966.)

Peterson, Joseph and Lanier, Lyle H. "Studies in the Comparative Abilities of Whites and Negroes." *Mental Measurement Monograph* 5 (February 1929). (156 pp.)

This study looks at the intelligence test scores of twelve-year-old white and black children and white and black adults. The authors (p. 151) write: "The outstanding result of our tests of adults is an enormous and reliable superiority of whites over Negroes in all four group intelligence tests, this being true of the wholly non-verbal International Rotator tests as well as of the Binet group, the Myers, and the Atkinson test. No sex differences in these tests are established." The authors (p. 152) thus conclude that "evidence points to a difference in native intellectual ability favoring the whites."

Scarr, Sandra. *Race, Social Class, and Individual Differences in IQ: New Studies of Old Issues*. Hillsdale, N.J.: Lawrence Erlbaum Associates, Inc., 1981. (545 pp.)

The publisher's pre-publication advertisement for this book reads as follows: "Never before have there been such large-scale studies of identical and fraternal twins in the U.S. black population, of transracially-adopted black children, or of white adolescents adopted in the first months of life. These new studies prompt some fascinating conclusions about the impact of environment on children as they are

growing up . . . the long-term effects of genetic differences on the lives that people lead . . . and the causes of racial, social class, and individual differences in intellectual skills."

The book is divided into five sections: I. Genetics and Intelligence; II. Race and IQ; III. Social Class and Individual Variation; IV. Conclusions and Implications (including an "editorial"); and V. Commentaries (including articles by Arthur R. Jensen and Leon J. Kamin, as well as "Comments and Replies" and a "Last Word" by the author).

Many of the chapters in this book appeared first as journal articles. The critiques and comments generated by the articles are also reprinted. The major theme that integrates all the chapters, Scarr (p. ix) writes, is the question: "Why do people differ from one another in intellectual performance?" The author is basically a centrist or moderate in the genetic-environmental debate—finding, for example, "no evidence for the hypothesis that the average difference in intellectual performance between U.S. whites and blacks results primarily from genetic racial differences" (p. 528).

Shuey, Audrey M. *The Testing of Negro Intelligence* (2nd Edition). New York: Social Science Press, 1966. (578 pp.)

This book is a modern-day classic (which is nevertheless quite difficult to find on library shelves). Dreger ("Hard-Hitting Hereditarianism," *Contemporary Psychology* 12 [February 1967]: 49-51) states that it is "the most complete compendium of research anywhere on intelligence testing of Negroes, and, directly or indirectly, on intelligence test comparisons of Negroes and whites. It is also the most respectable statement of the hereditarian position with which this reviewer is familiar." Dreger, in a "glowing" review, further writes: "Easy environmentalist generalizations cannot dismiss the patient scholarship, the careful ferreting out of multitudes of research studies [380 original studies and 184 related works], the accurate and succinct summaries of others' work, and the confronting of others with their errors . . . which this book affords. . . . When 'scientific' is used thus, it becomes a shibboleth."

Shuey examines evidence dealing with young children, school children, high school and college students, the armed forces, veterans and other civilians, deviates, delinquents and criminals, "racial hybrids," and the selective migration of blacks in the United States. Excellent "summary tables" for each of the population subgroups incorporate data from 81 separate tests of intelligence. In a 500-word "concluding statement" of one sentence, Shuey (pp. 520-521) finds that "[t]he remarkable consistency in test results . . . all taken together, inevitably point to the presence of native differences between Negroes and whites as determined by intelligence tests."

Sowell, Thomas, ed. *American Ethnic Groups*. Washington, D.C.: The Urban Institute, 1978. (251 pp.)

This book is one of the products of a study of American ethnic groups conducted by the Urban Institute from 1972 to 1975 under the direction of Thomas Sowell. Two chapters are especially relevant here: (1) a review of race and the IQ performance of various immigrant groups (by Sowell); and (2) a brief essay on sibling IQ correlations among ethnic groups (by Leon J. Kamin).

4. Controversial Aspects of Group Differences and Intelligence Testing.

Berry, Brewton and Tischler, Henry L. *Race and Ethnic Relations* (4th Edition). Boston: Houghton Mifflin Company, 1978. (433 pp.)

"In this volume, the authors attempt to describe and analyze the phenomena that arise when groups of people who differ racially or culturally come into

contact with one another. The focus is on relations, which includes much more than prejudice and discrimination" (p. xiv).

The book takes a comparative point of view and looks at race/ethnic relations in history throughout various regions of the world. It was written for college students who have the basic introductory courses in Sociology; however, technical terminology has been kept to a minimum.

This book devotes one chapter (of seventeen) to "Race and Intelligence." Chapter subheadings here include: "Race, Intelligence, and Heredity"; "What Do Intelligence Test Scores Mean?"; "Arthur Jensen"; "Hans J. Eysenck"; "Richard Herrnstein"; "William Shockley"; "Criticisms"; and "How Important is IQ?" The discussion of "race and intelligence" is notable because of its simple treatment, historical view, and placement within the context of this Sociology textbook. As the authors state (p. 85), "[t]he whole discussion of race differences with respect to intelligence is basically a fruitless debate given the stated values and ideals of American society."

Block, N.J. and Dworkin, Gerald, eds. *The IQ Controversy: Critical Readings*. New York: Pantheon Books, 1976. (557 pp.)

This is a very good reference for readers who are interested in investigating further the question of whether intelligence has a substantial genetic component. However, it should be noted that the editors have not attempted to present all sides of the issue. They have, instead, "brought together the best of the critical literature"—including articles directed specifically at Jensen and Herrnstein, and articles with a more general perspective (i.e., historical, sociological, and biological). The book is divided into four major sections: I. IQ (The Lippman-Terman Debate); II. Genetic Component of IQ Differences; III. Social and Political Consequences; and IV. IQ, Heritability and Inequality (including the longest article, by the editors).

Cancro, Robert, ed. *Intelligence: Genetic and Environmental Influences*. New York: Grune and Stratton, 1971. (312 pp.)

This book presents several articles on the subject, arranged into three major sections: I. Theory and Measurement; II. Genetic Contributions; and III. Environmental Contributions. The book is widely-cited in the literature—probably because it offers a variety of viewpoints, representing professors of Psychology, Psychiatry, Sociology, Biobehavioral Sciences, Education and Educational Psychology, and Biostatistics (Public Health).

Eckberg, Douglas Lee. *Intelligence and Race: The Origins and Dimensions of the IQ Controversy*. New York: Praeger Publishers, 1979. (275 pp.)

This book is an outgrowth of the author's doctoral dissertation (at the University of Texas at Austin). The author first examines (p. 6) four major assumptions (or "prior assertions"):

1. Paper-and-pencil tests constitute valid measures of human mental functioning.
2. This mental functioning can be characterized as metric-linear in structure, or at least approximately so, such that a single summary statistic (IQ) can stand for the congeries of elements that constitute the functioning.

3. Differences in this measured entity play important causal roles in educational and economic achievement.
4. Differences in this entity are largely hereditary. That is, they are both genetically inherited and beyond the power of environmental manipulation to modify beyond a relatively miniscule amount.

The development of psychometric psychology (and to a lesser extent, related sciences) are then traced, "in order to uncover the sources of the presuppositional treatment of these issues."

The book is thus divided into two major sections: I. The Status of the Hereditarian Position in the IQ Controversy; and II. The Historical Development of Hereditarian Psychology. The conclusion focuses on "meritocracy and modern social science."

The "overriding thesis" of the book, according to the author (p. 211), can be "stated quite simply": "First, the evidence for the hereditarian position in the modern IQ controversy is extremely weak. Despite this weakness, the position seems strong because a number of issues in the controversy have been allowed to lie largely unexamined. . . . A historical examination of the development of mental testing shows that these assumptions were commonly held at the time of the institutionalization of mental testing, and for this reason they were worked into the fabric of psychometric research."

Ehrlich, Paul R. and Feldman, S. Shirley. *The Race Bomb: Skin Color, Prejudice, and Intelligence*. New York: Quadrangle/The New York Times Book Co., 1977. (207 pp.)

The *Race Bomb* was written to show that the various genetic theories of racial inferiority are "not only unfounded but downright dangerous." The book was designed for the layman—to clear a path "through the dense underbrush of scientific fact and myth." It is a "popular" version of the view that (a) races are social, not biological, and (b) there is no scientific support for the notion that blacks are innately inferior to whites. The authors examine definitions of intelligence and IQ tests, and describe what they believe is the misuse and misinterpretation of test data in the racial context.

Environment, Heredity, and Intelligence. Reprint Series No. 2. Compiled from the *Harvard Educational Review*. Cambridge, MA.: Harvard Educational Review, 1969.

The highly controversial article by Jensen, "How Much Can We Boost IQ and Scholastic Achievement?" (1969), appears in this reprint series by the *Harvard Educational Review*. The reprint series also presents the five responses that appeared in the subsequent edition of the journal. The authors of the other articles are: Carl Bereiter, Lee Cronbach, James Crow, David Eikind, and J. McVicker Hunt.

Eysenck, H.J. *The IQ Argument: Race, Intelligence and Education*. New York: The Library Press, 1971. (155 pp.)

Eysenck (p. 136) writes that "we will not succeed in changing human nature by refusing to recognize facts." Thus, he continues (p. ii), "this book aims to present the relevant facts, with as little interpretation as possible; only knowledge

of these facts makes it possible to come to any sort of rational conclusion [i.e., regarding the inheritance of intelligence, IQ testing, and the alleged inferiority of blacks on IQ tests]."

The book proceeds to present in a "popular" style the highly controversial evidence on race and the genetic linkages with intelligence. The book is divided into the following chapters: 1. The Jensenist Heresy; 2. What is Race?; 3. What is Intelligence?; 4. The Intelligence of American Negroes; 5. Changing Human nature; and 6. The Social Responsibility of Science.

Flynn, James R. *Race, IQ and Jensen*. London: Routledge and Kegan Paul, 1980. (3.3 pp.)

The title of this book gives a good indication of its contents and tone. The author presents a summary of Jensen's case and then argues that blacks and whites in America are roughly equivalent in terms of genes for IQ. He stresses the use of "direct evidence"—that is, evidence which is obtained when blacks and whites actually exchange environments (e.g., black children adopted by white parents, children of black troops stationed in Germany, black and white children raised in residential nurseries, blacks with degrees of white ancestry).

The publisher claims that, though many other authors have attempted to refute Jensen's views, "this is the first book by a single author which aims to answer him coherently on every point."

Herrnstein, R.J. *IQ in the Meritocracy*. Boston: Atlantic Monthly Press, 1973. (235 pp.)

This book grew out of an article entitled "I.Q.," published in *The Atlantic* in September 1971. The publication of the article drew a critical response not unlike that which followed the appearance of Arthur Jensen's essay in 1969.

The main theme of Herrnstein's argument is that progress toward the equalization of opportunity is progress toward a hereditary "meritocracy." Intelligence is largely inherited, he finds. As environmental influences become similar for groups they become less important in relation to inherited characteristics. And, since IQ is a powerful prerequisite for success, emphasis on environmental equality perpetuates social rigidity—with certain able families perpetually at the top of the social ladder, and certain dull ones at the bottom.

The book contains five chapters: 1. Whence Testing?; 2. What is Intelligence?; 3. The uses of Intelligence; 4. Nature and Nurture; and 5. The Specter of Meritocracy.

Jensen, Arthur R. *Genetics and Education*. New York: Harper and Row, 1972. (369 pp.)

Reprinted in this book are Jensen's original piece from the *Harvard Educational Review* ("How Much Can We Boost IQ and Scholastic Achievement?") and closely related articles that have appeared in other publications (including a theory of primary and secondary familial mental retardation, an estimation of the "heritability" of intelligence, and a study of the IQs of identical twins who were reared apart). Jensen also includes a selected bibliography of articles that have appeared in response to his essay in the *Harvard Educational Review* and a bibliography of "Articles by Arthur R. Jensen."

Jensen, Arthur R. *Bias In Mental Testing*. New York: The Free Press, 1980. (786 pp.)

This is perhaps the most detailed and thoroughly researched book yet to appear on the subject of bias in mental testing. Jensen examines psychometric methods for detecting bias in mental testing and also for applying standardized tests fairly in education, personnel management, and other areas. Jensen concludes that the most widely used standardized tests are not biased against any of the native-born English-speaking minority groups for whom sufficient data exists. Furthermore, non-verbal tests give unbiased results even for those whose language is not English. "The observed mean differences in test scores between various groups," Jensen states (p. 740), "are generally not an artifact of the tests themselves, but are attributable to factors that are causally independent of the tests."

Jensen reviews the objections to standardized testing and concludes that the criticisms are unsubstantial. He then discusses at length the method and purpose of standard testing formats and their statistical interpretation. Jensen examines the manner in which tests are used, and criticizes the various abuses by those who administer them.

This is a valuable source on mental testing and the causative factors of performance by certain subpopulation categories—regardless of whether or not one agrees with Jensen's interpretations or methodology. The book brings together a wealth of information from a variety of otherwise scattered materials. In addition, there is a short glossary of terms (for the layman) and a very complete list of references (over 850 separate titles).

Kamin, Leon J. *The Science and Politics of IQ*. Potomac, MD.: Lawrence Erlbaum Associates, 1974. (183 pp.)

The publisher writes that "here, finally, is an effective antidote to virulent assertions that have been based on the notion that IQ is largely heritable. The author's review of the available empirical evidence, and his intensive analysis of these data, lead to the conclusion that there are no adequate grounds for the belief that IQ is largely heritable."

Kamin examines first the "pioneers of IQ testing in America" and the various ways in which IQ tests have been used to bring about eugenic sterilization laws and policies aimed at immigrant exclusion. He then reviews studies of separated twins, kinship correlations, and adopted children. The final two chapters of the book look at "the accuracy of secondary sources" and "IQ in the uterus." Kamin (pp. 1-2) concludes that (1) "there exist no data which should lead a prudent man to accept the hypothesis that IQ test scores are in any degree heritable"; and (2) "the IQ test in America, and the way in which we think about it, has been fostered by men committed to a particular social view" (including "the belief that those on the bottom are genetically inferior victims of their own immutable defects").

Lawler, James M. *IQ, Heritability and Racism*. New York: International Publishers, 1978. (192 pp.)

Lawler criticizes the theory and method of IQ testing as well as the various assumptions concerning the "nature" end of the "nature-nurture" controversy. Lawler, a philosopher, examines the theories (or lack of them) underlying notions

of intelligence and IQ. He approaches the subject as a Marxist. The author (p. 6) writes: "The object of this essay is to examine the basic concepts and methods that are most pertinent to the arguments which Jensen and others have put forward, to expose their philosophical and ideological presuppositions and prejudices, and to outline an alternative interpretation based on the concepts of dialectical and historical materialism."

Montagu, Ashley, ed. *Race and IQ*. New York: Oxford University Press, 1975. (322 pp.)

Ashley Montagu criticizes the use of "race" as a legitimate concept, attempts to debunk the term "IQ," and criticizes those scientists (Jensen, Shockley, Herrnstein, and Eysenck) who claim to have found a link between the two.

The book includes articles by fifteen authorities in fields ranging from biology and genetics to psychology, anthropology, and education in order to examine from various viewpoints (a) the scientific validity of intelligence tests and (b) the various evaluations of the so-called "innate" intelligence of individuals and ethnic groups or races.

The articles, according to the publisher, "offer a basis for understanding the grounds upon which those who claim to be able to separate the genetic from the environmental contribution to intelligence base their arguments." Montagu (pp. 15-16) writes: "This book deals with some of the principal unsound assumptions of Professor Jensen's writings in the hope, among other things, that the demonstration of the errors into which he has fallen may serve to set the record straight."

Schmaltz, Leonard W., ed. *Scientific Psychology and Social Concern*. New York: Harper and Row, 1971.

"Part Seven" of this book includes five articles on "Heredity, Measurement, and Intelligence":

- "The Nature of Intelligence" by David Wechsler
- "Race Differences" by Arthur R. Jensen
- "Inadequate Evidence and Illogical Conclusions" by Jerome S. Kagan
- "Behavior-Genetic Analysis and Its Biosocial Consequences" by Jerry Hirsch
- "How to Talk Back to a Statistic" by Darrell Huff

The article by Jensen is an excerpt from his controversial work in the *Harvard Educational Review* (1969). The article by Kagan was one of five papers appearing in a follow-up issue of the *Harvard Educational Review* (1969). Kagan criticizes Jensen's logic and finds that any IQ data collected in the standardized manner may not reflect the actual potential of lower-class children.

The article by Hirsch points out additional considerations for the study of the relationships between genetics and behavior. "In summary," Hirsch (p. 311) concludes, "the relationship between heredity and behavior has turned out to be one of neither isomorphism nor independence. Isomorphism might justify an approach like naive reductionism, independence a naive behaviorism. Neither one turns out to be adequate."

Senna, Carl, ed. *The Fallacy of IQ*. New York: The Third Press, 1973. (184 pp.)

This book presents a collection of essays on the subject of intelligence testing. The "hereditarian" estimate of genetic linkages with intelligence is refuted by a biologist (Richard Lewontin) and an educational psychologist (Christopher Jencks). The social meaning of IQ and what IQ attempts to measure is the subject of two essays. Finally, a report prepared in connection with a federal research project (The Milwaukee Study) is reprinted.

Vernon, Philip E. *Intelligence: Heredity and Environment*. San Francisco: W.H. Freeman and Company, 1979. (390 pp.)

The author writes in the preface to this book: "In this volume, then, I have tried to summarize all the major investigations that indicate environmental and genetic effects and to show that the gap between them is much smaller than is generally believed" (p. vii). Also: "This book is inevitably technical in places, though it has been simplified considerably for the nonpsychologist" (p. viii).

The book is divided into four major sections: I. The Nature of Intelligence; II. Child Development and Environmental Effects on Intelligence; III. Genetic Influences on Individual Differences in Intelligence; and IV. Genetic Influences on Group Differences. Of particular interest in the last section are separate chapters on: the testing of racial, ethnic, and socioeconomic groups; studies of racial and ethnic differences in intelligence; cultural bias; and "conclusions regarding racial-ethnic differences."

This is a readable, balanced treatment of the "nature" and "nurture" positions, incorporating over 500 references on the topic. Vernon (p. 332) concludes that "both genetic and environmental factors are always involved, and their relative variance cannot, as yet, be quantified." There is "no clear verdict in either direction," he adds.